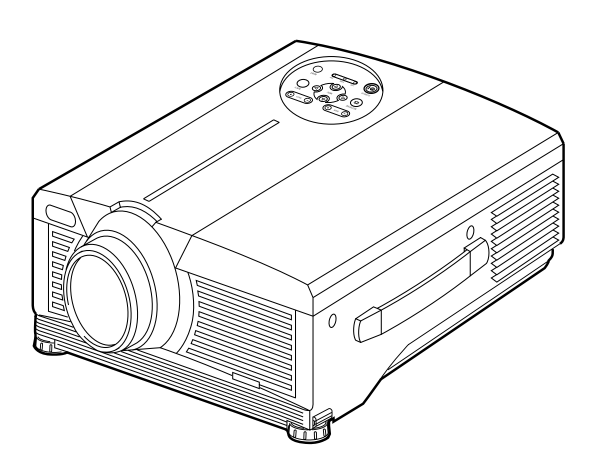
HITACHI

SERVICE MANUAL

YK	No.0523E

CP-X995W
(P4XM2)



Caution

Be sure to read this manual before servicing. To assure safety from fire, electric shock, injury, harmful radiation and materials, various measures are provided in this HITACHI Multimedia LCD Projector. Be sure to read cautionary items described in the manual to maintain safety before servicing.

Service Warning

1. When replace the lamp, to avoid burns to your fingers. The lamp becomes too hot.
2. Never touch the lamp bulb with a finger or anything else. Never drop it or give it a shock. They may cause bursting of the bulb.
3. This projector is provided with a high voltage circuit for the lamp. Do not touch the electric parts of power unit (main), when turn on the projector.
4. Do not touch the exhaust fan, during operation.
5. The LCD module assembly is likely to be damaged. If replacing to the LCD module assembly, do not hold the FPC of the LCD module assembly.
6. Use the cables which are included with the projector or specified.

Contents

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT.

Multimedia LCD Projector

June 2002 Digital Media Division

1. Features

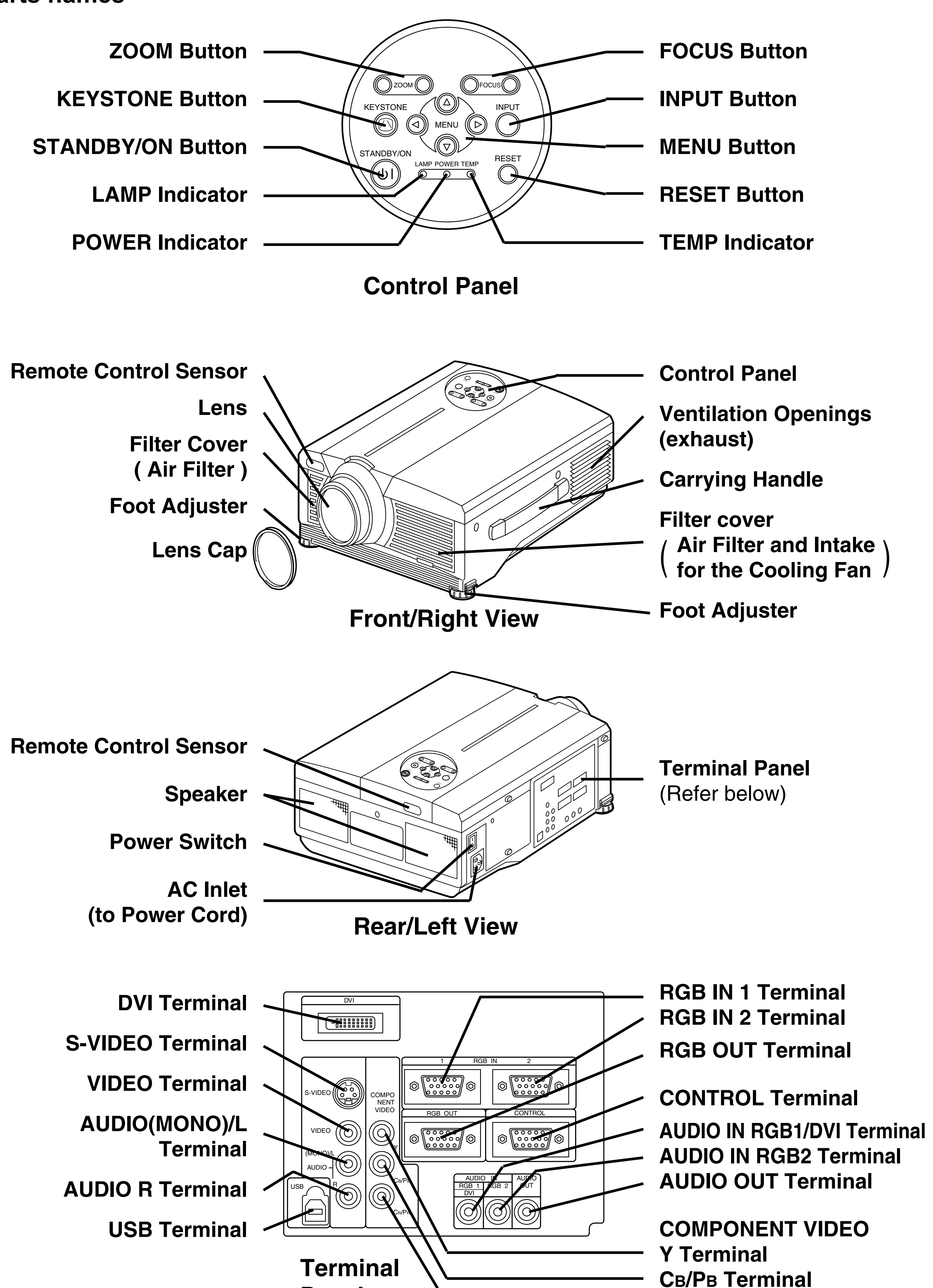
- High brightness, High resolution
- RGB output terminal
- RS-232C Communication
- Mouse emulation
- Power zoom and power focus functions
- Complies with VESA DDC1/2B specifications
- Auto-adjustment function

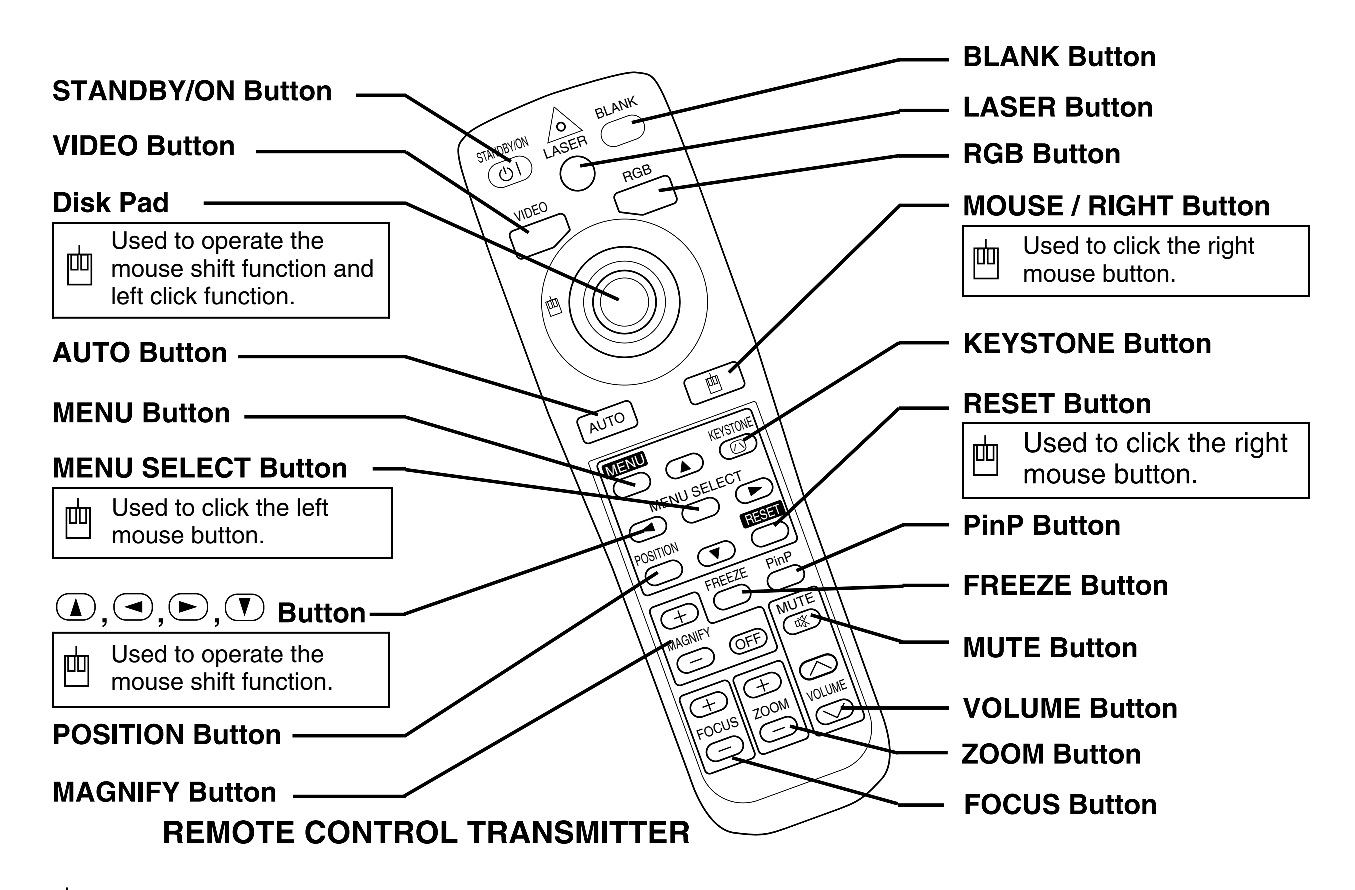
2. Specifications

Liquid crystal panel	Drive system		TFT active matrix
	Panel size		1.3 inches
	Number of pixels		1024 (H) × 768 (V)
Lamp			275W UHB
Video input	Composite Y/C	System	NTSC, NTSC4.43, PAL(-BGDHI), SECAM, PAL-M, PAL-N, PAL60
		Level	Composite 1.0Vp-p (75Ω termination) Y/C Y : 1.0Vp-p (75Ω termination) C : 0.286Vp-p (NTSC burst signal, 75Ω termination) 0.3Vp-p (PAL/SECAM burst signal, 75Ω termination)
	Component	System	480i(525i), 575i(625i), 480p(525p), 1080i(1035i, 1125i), 720p(750p)
		Level	Y 1.0Vp-p (75Ω termination) Cb/Cr 0.7Vp-p (75Ω termination) Pb/Pr 0.7Vp-p (75Ω termination)
RGB	Digital input		Type T.M.D.S Video signal DC:150~1200mV, AC:1.56Vp-p Sync signal TTL level
	Analog input/output		Type R.G.B separate Video signal 0.7Vp-p (75Ω termination) Sync signal H/V separate or composite, TTL level
Audio	Input		200mVrms, 50kΩ or less
	Output		0~200mVrms, 1kΩ
Speaker output			1.2W + 1.2W (stereo)
Power supply			AC100~120V/4.7A, AC220~240V/2.0A
Power consumption			440W
Dimensions			308.5 (W) × 144 (H) × 395 (D) mm
Weight			6.5kg (14.3lbs)
Temperature range			Operation : 0~35°C Storage : -20~60°C
Accessories			Remote control transmitter × 1 RGB cable × 1 Mouse cable × 1 Component cable × 1 POWER cord × 3 BATTERIES LR6 × 2 User's manual (with Safety Instructions)× 1

3. Names of each part

● Parts names



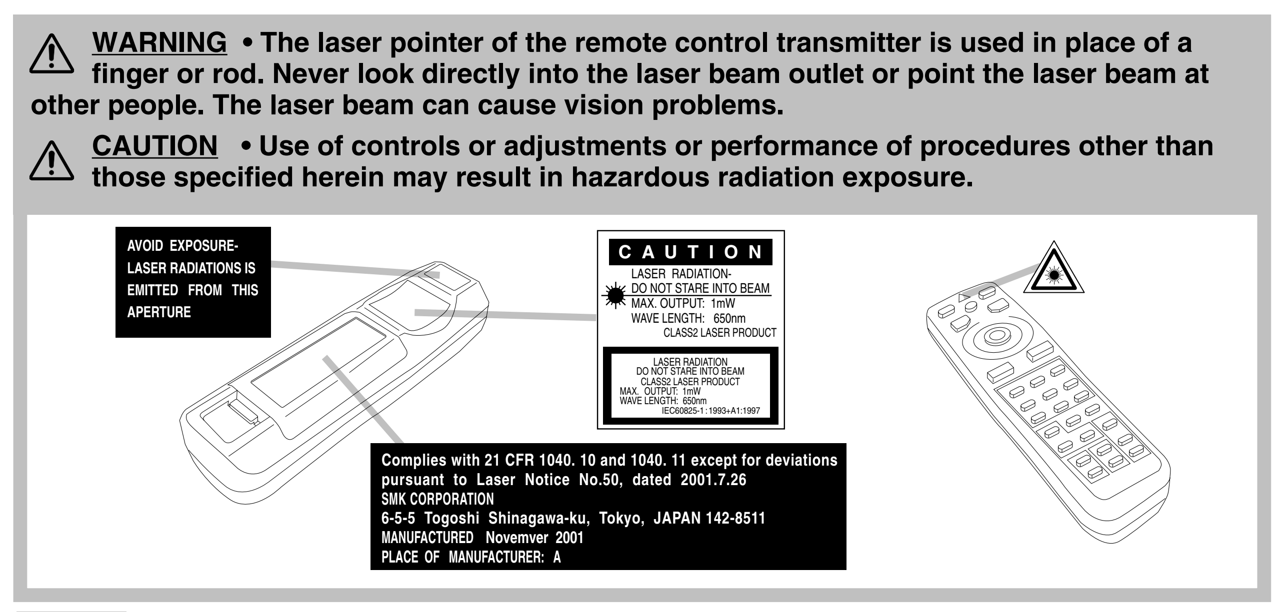


REMOTE CONTROL TRANSMITTER

These functions works when the mouse control function is activated. Remember, the POSITION, BLANK ON and MENU ON functions disable the mouse control function.

⚠ WARNING • The laser pointer of the remote control transmitter is used in place of a finger or rod. Never look directly into the laser beam outlet or point the laser beam at other people. The laser beam can cause vision problems.

⚠ CAUTION • Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.



NOTE • Keep the remote control transmitter away from children and pets.
- Do not give the remote control transmitter any physical impact. Take care not to drop.
- Do not place the heavy objects on the remote control transmitter.
- Do not wet the remote control transmitter or place it on any wet object.
- Do not place the remote control transmitter close to the cooling fan of the projector.
- Do not disassemble the remote control transmitter.

OSD Message

The messages as described below may appear on the screen at power ON. Take the appropriate measures when such messages appears.

Message	Contents
CHANGE THE LAMP AFTER REPLACING LAMP, RESET THE LAMP TIME. (*1)	The usage time of lamp will be reaching 2000 hr shortly.(*2) It is recommended to replace the lamp soon. Prepare a new lamp as a replacement.
CHANGE THE LAMP AFTER REPLACING LAMP, RESET THE LAMP TIME. THE POWER WILL TURN OFF AFTER ** hr. (*1)	The usage time of lamp will be reaching 2000 hr shortly. It is recommended to replace the lamp within * * hours.(*2) It might be happened that the lamp is cut off before * * hr by any chance. Power will be switched OFF automatically in * * hours. Replace the lamp as shown in P.21~22 “Lamp”. Always reset the lamp timer after replacing the lamp.
CHANGE THE LAMP AFTER REPLACING LAMP, RESET THE LAMP TIME. THE POWER WILL TURN OFF AFTER 0 hr.	The usage time of lamp is about to reach. Power will be switched OFF in a few minutes.(*2) Switch power OFF immediately and replace the lamp as shown in P.21~22 “Lamp”. Always reset the lamp timer after replacing the lamp.
NO INPUT IS DETECTED ON ***	No input signal found. Check signal input connections and signal sources.
SYNC IS OUT OF RANGE ON ***	The horizontal or vertical frequency of the input signal is not within the specified range. Check the specifications of the equipment and the signal source.
CHECK THE AIR FLOW	The internal temperature has risen. Switch power OFF, and wait 20 minutes until the equipment cools. Check the following and Switch power ON again. * Are the ventilation openings blocked. * Is the air filter dirty. * Is the ambient temperature in excess of 35°C.

NOTE (*1) This message is cleared automatically after approximately three minutes, and appears every time power is switched ON.

(*2) The unit has a function to turn the power off which will be active when the usage time reaches 2000 hr. However the life of lamp might be much different among lamps, so that it might be happened that a lamp is cut off before the function is active.

Indicators Message

The POWER indicator, LAMP indicator, and TEMP indicator are lit and blank as follows. Take the appropriate measures.

POWER indicator	LAMP indicator	TEMP indicator	Contents
Lights orange	Turns off	Turns off	The Standby mode has been set.
Blinks green	Turns off	Turns off	Warming up. Please wait.
Lights green	Turns off	Turns off	ON. Normal operation possible.
Blinks orange	Turns off	Turns off	Cooling. Please wait.
Lights red	Lights red	Turns off	Lamp is not lit. The interior of the equipment may be too hot. Switch power OFF, wait 20 minutes until the equipment cools, and check whether the ventilation openings are blocked, whether the air filter is dirty, or whether the ambient temperature exceeds 35 °C. And switch power ON again. Replace the lamp if the same problem occurs.
Lights red	Blinks red	Turns off	Lamp or lamp cover is not found, or hasn't been fitted in correctly. Switch power OFF, and wait for 45 minutes until the equipment cools. Check fitting of the lamp and lamp cover, and switch power ON again. Contact your dealer if the same problem occurs again.
Lights red	Turns off	Blinks red	The cooling fan is not operating. Switch power OFF, and wait for 20 minutes until the equipment cools. Check for foreign matters in the fan, and switch power ON again. Contact your dealer if the same problem occurs again.
Lights red	Turns off	Lights red	The interior of the equipment is too hot. Switch power OFF, and wait for 20 minutes until the equipment cools. Check whether the ventilation openings are blocked, whether the air filter is dirty, or whether the ambient temperature exceeds 35 °C. Then switch power ON again. Contact your dealer if the same problem occurs again.

NOTE When the internal temperature becomes excessive power is switched OFF automatically for safety reasons, and the indicator is extinguished. Set the power switch to [O] and wait for 20 minutes until the equipment has cooled sufficiently.

4. Adjustment

4-1 Before adjusting

4-1-1 Adjustment menu

1. Before starting adjustment, warm up the projector for about 10 minutes. (Blank white)
2. Set Zoom Wide to Max. and project an image a distance of more than 40 inches.
3. Normalizing the video adjustment.
   (Press the [MENU] button of the Remote control transmitter to display the Setup menu, then press the [RESET] button. And select the [DEFAULT].)
   *note : The setup menu is not displayed on with no signal.
4. Perform all adjustments from the Adjustment menu. Perform the following operations to display the Adjustment menu.
   a. Press the [MENU] button of the Remote control transmitter (the Setup menu will appear).
   b. Next, press the [RESET] button one time. And press the [RESET] button again for 5 seconds or more (the Adjustment menu will appear).

4-1-2 Required adjustment

Relation between the replacement part and required adjustment are shown in Table 4-1-2.

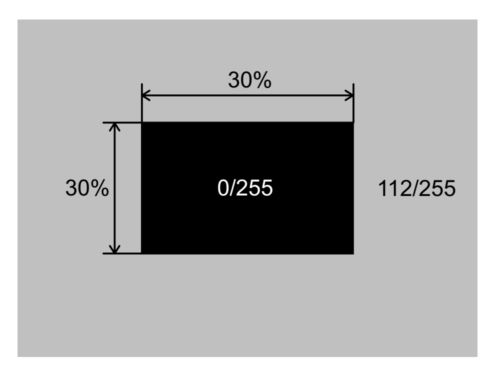
Tabel 4-1-2: Required adjustment

Required adjustment	Replaced part			
	Dichroic optics unit	LCD/LENS prism assembly	PWB assembly drive	Lamp unit
Ghost (Chap.4-2)	○	○	○	△
Flicker (Chap.4-3)	×	○	○	×
NRSH (Chap.4-4)	×	○	○	×
White balance (Chap.4-5)	○	○	○	△
Color uniformity (Chap.4-6)	○	○	○	△

○: need △: recommend ×: no need

4-2 Ghost adjustment

Signals for internal adjustment

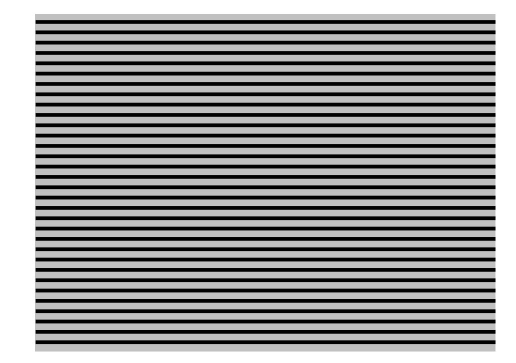


Adjustment procedure

1. Use DAC-P - GHOST - R: in the Adjustment menu to adjust so that R color ghost is at a minimum.
   (Press the [RESET] button, then raise the value. When a ghost appears to the left of a vertical line, reduce the value by 2 steps.)
2. In the same way, use DAC-P - GHOST-G: in the Adjustment menu to adjust so that G color ghost is at a minimum.
3. In the same way, use DAC-P - GHOST-B: in the Adjustment menu to adjust so that B color ghost is at a minimum.

4-3 Flicker adjustment (V.COM adjustment)

Signals for internal adjustment

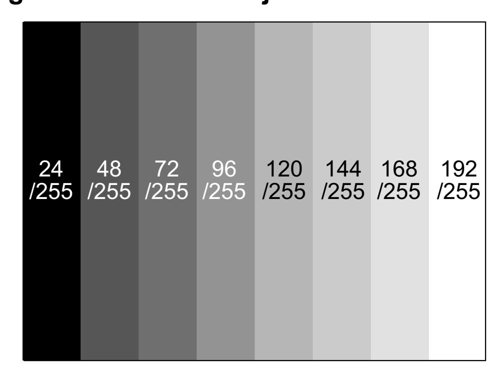


Adjustment procedure

1. Make this adjustment after completing the adjustment in 4-2 Ghost adjustment.
2. Use DAC-P - V.COM - R: in the Adjustment menu to adjust so that the flicker at the center of the screen is less than the flicker at the periphery.
   (When the flicker is about the same across the whole screen, adjust so that the flicker at the center of the screen is somewhat less than elsewhere.)
3. In the same way, use DAC-P - V.COM-G: in the Adjustment menu to adjust the G color flicker.
4. In the same way, use DAC-P - V.COM-B: in the Adjustment menu to adjust the B color flicker.

4-4 NRSH adjustment (vertical stripe adjustment)

Signals for internal adjustment



Adjustment procedure

1. Make this adjustment after completing the adjustment in 4-3 Flicker adjustment.
2. Use DAC-P - NRSH - R: in the Adjustment menu to adjust so that the vertical lines spaced every 12 dots are as inconspicuous as possible.
   (Reduce the adjustment value when black stripes appear in the 2nd or 3rd tone from the black side. Note that when the adjustment value is lowered, white stripes may appear in the 2nd or 3rd tone from the bright side. Should this happen, adjust so that the stripes are as inconspicuous as possible.)
3. In the same way, use DAC-P - NRSH - G: in the Adjustment menu to adjust vertical stripes of G color.
4. In the same way, use DAC-P - NRSH - B: in the Adjustment menu to adjust vertical stripes of B color.

4-5 White balance adjustment (visual inspection)

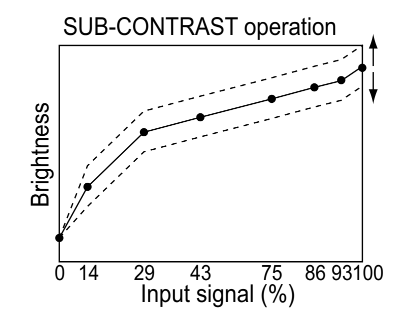
Preparations

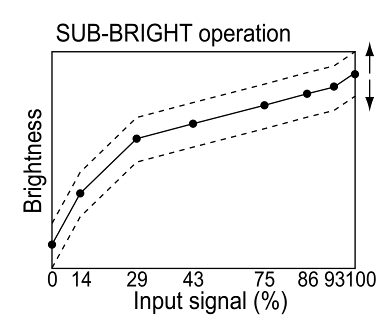
1. Perform these adjustments after the NRSH adjustment described in Section 4-4.
2. Reset gamma correction before adjustment.
   - Place the cursor on [GAMMA] in the Adjustment menu, press the [RESET] key and select [DEFAULT].

Adjustment procedure

1. First, adjust the G color.
2. Select GAMMA, SUB-CONTRAST, and G: in the Adjust menu. If the background is white solid, press the [MENU SELECT] key on the Remote control transmitter to change to [G] monochrome in the 28-tone grayscale.
3. Adjust GAMMA, SUB-CONTRAST, and G: in the Adjust menu so that brightness of 28 steps is best.
4. Don’t adjust GAMMA, SUB-BRIGHT, and G: in the Adjust menu. Because we want to keep the best contrast ratio.
5. Then adjust colors R and B.
6. Select GAMMA, SUB-CONTRAST, and G: in the Adjust menu. If the background is white solid, press the [MENU SELECT] key on the Remote control trasmitter to change to [W] monochrome in the 28-tone grayscale.
7. Adjust GAMMA, SUB-BRIGHT, R: and B: in the Adjust menu so that low-brigtness white balance is best.
8. Adjust GAMMA, SUB-CONTRAST, R: and B: in the Adjust menu so that middle-brightness white balance is best.
9. Repeat steps 7 to 8 above, and adjust so that brightness white balance of 28 steps is best.

Adjustment operations (reference)



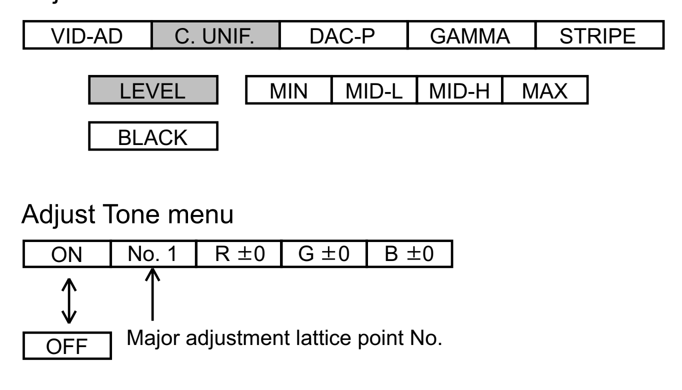


4-6 Color uniformity adjustment

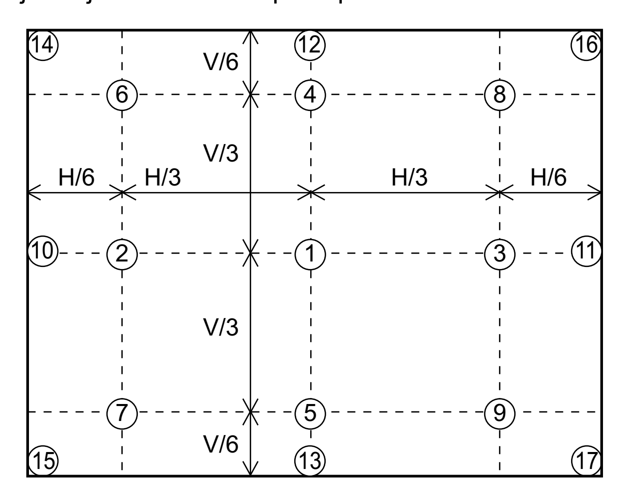
Preparations

1. Perform these adjustments after the white balance adjustment described in Section 4-5.
2. Make a color uniformity adjustment for the following four tones.
   - MIN tone (approx. 0% input signal)
   - MID-L tone (approx. 11% input signal)
   - MID-H tone (approx. 36% input signal)
   - MAX tone (approx. 75% input signal)
3. Place the cursor on the tone to be adjusted in the Adjust menu and press the [▼] key. This displays the Adjust Tone menu at the bottom of the screen. Select the major adjustment lattice point No. and color, and then adjust them.
4. The major adjustment lattice point numbers (a total of 17 points) corresponds to the major adjustment lattice point positions in the diagram on the right. The color uniformity of the entire screen can be adjusted by adjusting the white balance for each of the points starting in order from the low numbers.
5. Adjustment point No.1 should not be adjusted, because it controls the brightness of the entire screen.
6. To temporarily turn correction off, place the cursor on "ON" in the Adjust Tone menu and press the [▼] key. To turn it on again, place the cursor on OFF in the Adjust Tone menu and press the [▲] key.
7. Although this adjustment can also be made using internal signals, we will here use the [MENU SELECT] key on the Remote control transmitter to select the following two signals.
   - Solid monochrome adjustment color (use G color adjustment when a color differential meter is used).
   - Solid white (use for adjustment other than above).
8. Reset color-shading correction before adjustment.
   - When 4 tones and all colors are to be reset, place the cursor on [C.UNIF.] in the Adjustment menu, press the [RESET] key and select [DEFAULT].
   - When only 1 tone is to be reset, place the cursor on the tone to be reset, press the [RESET] key and select [DEFAULT].
   - Single tone and monochrome resets cannot be performed.

Adjust menu



Major adjustment lattice point position



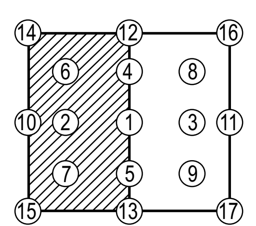
Adjustment procedure 1
(when a color differential meter is used)

1. First adjust [MID-L] tone [G:].
2. Select adjustment point [No.2][G:].
   When the background is not [G] monochrome, press the [MENU SELECT] key on the Remote control transmitter to change to solid [G] monochrome.
3. Measure the illumination at adjustment points No. 2, No.3, No.10 and No.11.
   The values should be:
   No.2 = Y2 [lx]   No.10 = Y10 [lx]
   No.3 = Y3 [lx]   No.11 = Y11 [lx]
4. No.2 and No.3 adjustment point have the average of Y2 and Y3.
   Y2 = (Y2 + Y3) / 2 ± 2 [%]
   Y3 = (Y2 + Y3) / 2 ± 2 [%]
5. No.10 and No.11 adjustment point have the average of Y10 and Y11.
   Y10 = (Y10 + Y11) / 2 ± 2 [%]
   Y11 = (Y10 + Y11) / 2 ± 2 [%]
6. Then adjust [MID-L] tone [R] and [B].
   When the background is [G] monochrome, press the [MENU SELECT] key on the Remote control transmitter to change to solid white.
7. Measure the color coordinates of adjustment point [No.1] and make a note of them.
   Assume that they are x = x1, y = y1.
   Note: When the CL-100 color and color difference meter is used, the [Δ](delta) mode is convenient. When adjustment point [No.1] color coordinate has been selected, set the slide switch on the side to [Δ](delta) while holding down the [F] button on the front panel. The measurement shown after this displays the deviation from measurement point 1.
8. Measure the color coordinates of measurement point [No.2] and adjust [No.2][R:] and [B:] so that the coordinates are as follows.
   x = x1 ± 0.003 , y = y1 ± 0.005 (Target)
   x = x1 ± 0.010 , y = y1 ± 0.020
9. Similarly, measure adjustment points [No.3] to [No.17] and adjust their color coordinates starting in order from the small number points.
   This completes adjustments required for [MIN].
   Note: Since excessive correction may lead to a correction data overview during internal calculations, use the following values for reference.
   [No.2] to [No.5] ± 40 or less
   [No.6] to [No.9] ± 50 or less
   [No.10] to [No.13] ± 70 or less
   [No.14] to [No.17] ± 120 or less
10. Then adjust [MIN] tone [G] so that the adjustment data set two times as much as [MID-L] tone [G].
    This completes [G] color adjustments.
11. Then adjust [MIN] tone [R] and [B].
    Select [No.2] [B:] and press the [MENU SELECT] key on the Remote control transmitter to change to solid white.
12. Measure the color coordinates of adjustment point [No.1] and make a note of them.
    Assume that they are x = x1, y = y1.
13. Now measure the color coordinates of measurement point [No.2] and adjust [No.2][R:] and [B:] so that the coordinates are as follows.
    x = x1 ± 0.005 , y = y1 ± 0.010 (Target)
    x = x1 ± 0.020 , y = y1 ± 0.040
14. Similarly, measure adjustment points [No.3] to [No.17] and adjust their color coordinates starting in order from the small number points.
    This completes [MIN] tone adjustments.
15. Now make similar adjustments for [MID-H] tone.
    (Adjust [MID-H] tone [G] so that the adjustment data set half as many as [MID-L] tone [G].)
16. Now make similar adjustments for [MAX] tone.
    (Adjust [MAX] tone [G] so that the adjustment data set half as many as [MID-L] tone [G].)

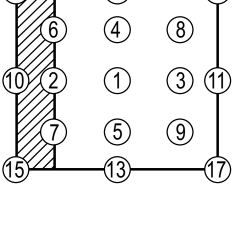
Adjustment procedure 2
(visual inspection)

1. First adjust [MIN] tone [G:].
2. Select [No.2] [G:].
   If the background is [G] monochrome, press the [MENU SELECT] key on the Remote control transmitter to change to solid white.
3. View measurement point [No.2] and [No.3].
   Lower the [G] color intensity only of the color point whose [G] color is more intense than measurement point [No.1].
4. View measurement point [No.10] and [No.11].
   Lower the [G] color intensity only of the color point whose [G] color is more intense than measurement point [No.1], and raise the intensity of the point whose color intensity is lower than measurement point [No.1].
5. Now adjust the [MIN] tone for colors [R] and [B].
6. View measurement points [No.2], [No.3], [No.10] and [No.11]. Adjust the [R] and [B] of each measurement point so that they have the same color as measurement point [No.1].
   Adjustment technique:
   First, adjust [B:] of the point whose color is to be adjusted so that it approximates that of [No.1]. If [R:] is low at this time, the image will have cyan cast, in which case [R:] is increased. On the other hand, if [R:] is excessive, the image will have a magenta cast, in which case [R:] is decreased.
   Overall, a cyan cast makes it easy to see color shading.
7. Next, view measurement points [No.4], [No.5], [No.12], [No.13] and make similar adjustments.
8. Then adjust measurement points [No.6], [No.7], [No.8], [No.9], [No.14], [No.15], [No.16] and [No.17].
   This completes the [MIN] tone adjustments.
9. Make similar another three tones as described in steps 1 to 8 above.

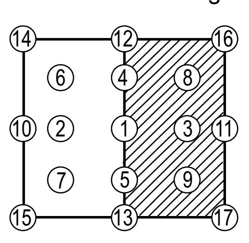
No. 2 deviation range



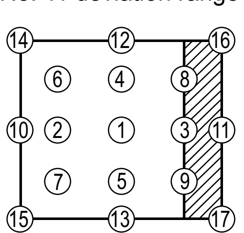
No. 10 deviation range



No. 3 deviation range

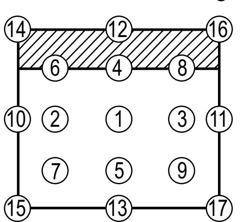


No. 11 deviation range

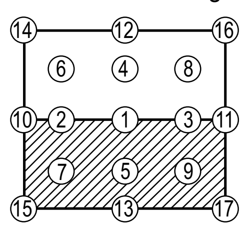


No. 4 deviation range

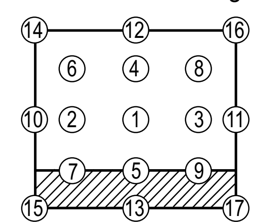
No. 12 deviation range



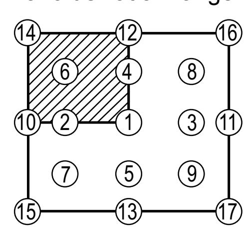
No. 5 deviation range



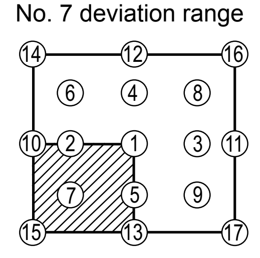
No. 13 deviation range



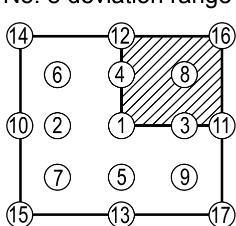
No. 6 deviation range



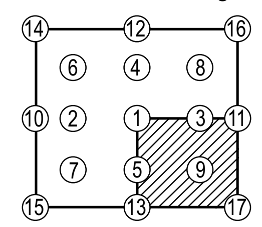
No. 7 deviation range



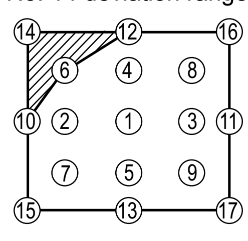
No. 8 deviation range



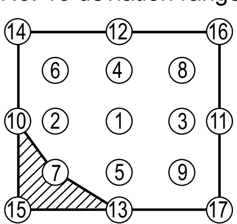
No. 9 deviation range



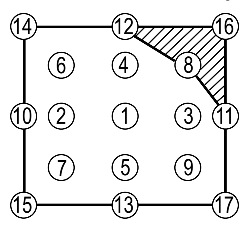
No. 14 deviation range



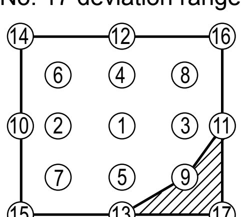
No. 15 deviation range



No. 16 deviation range

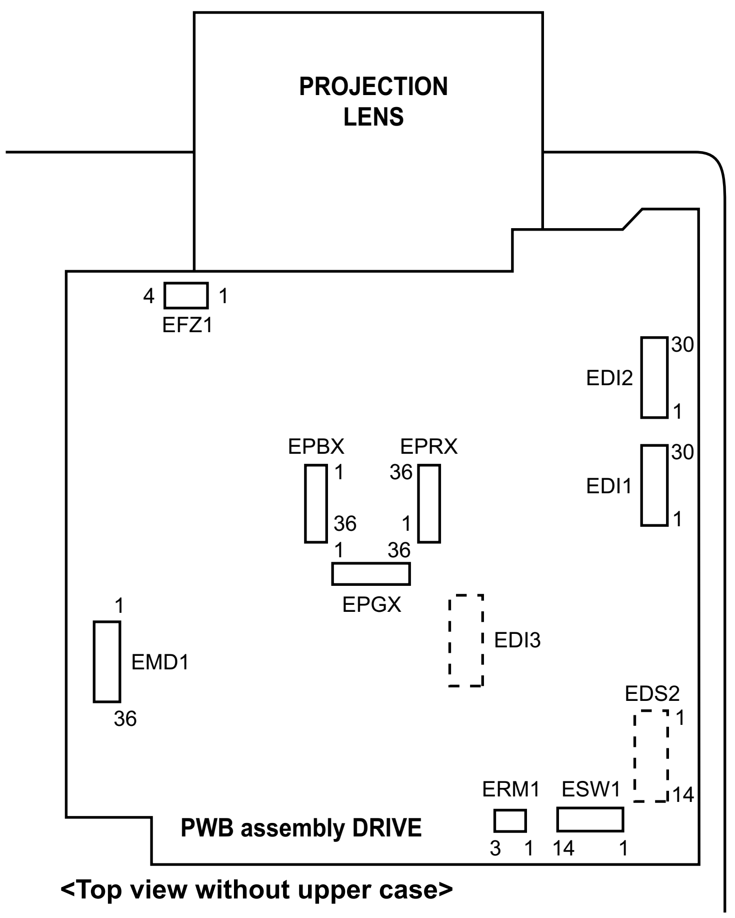


No. 17 deviation range



5. Troubleshooting

Check points at trouble shooting

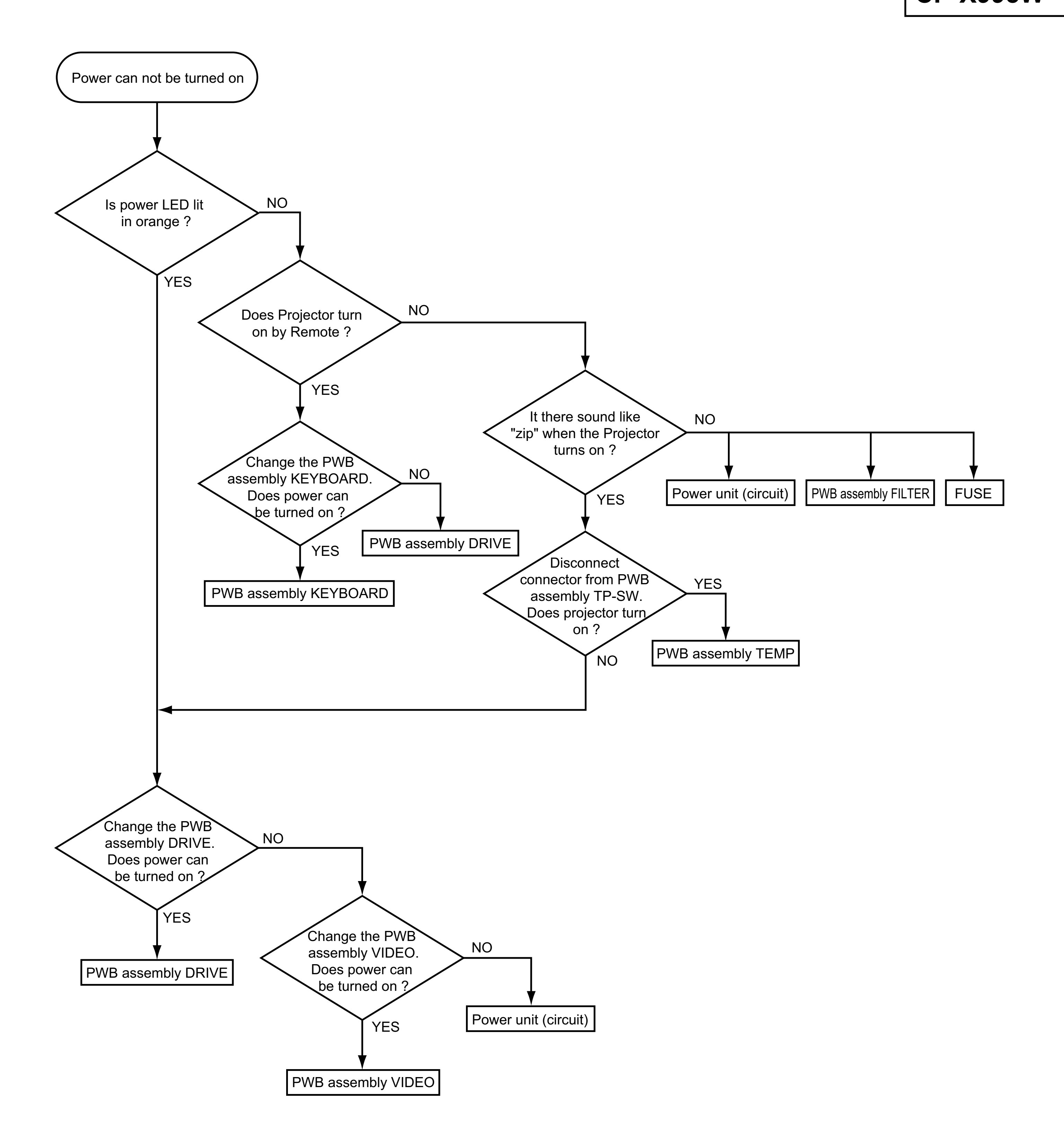


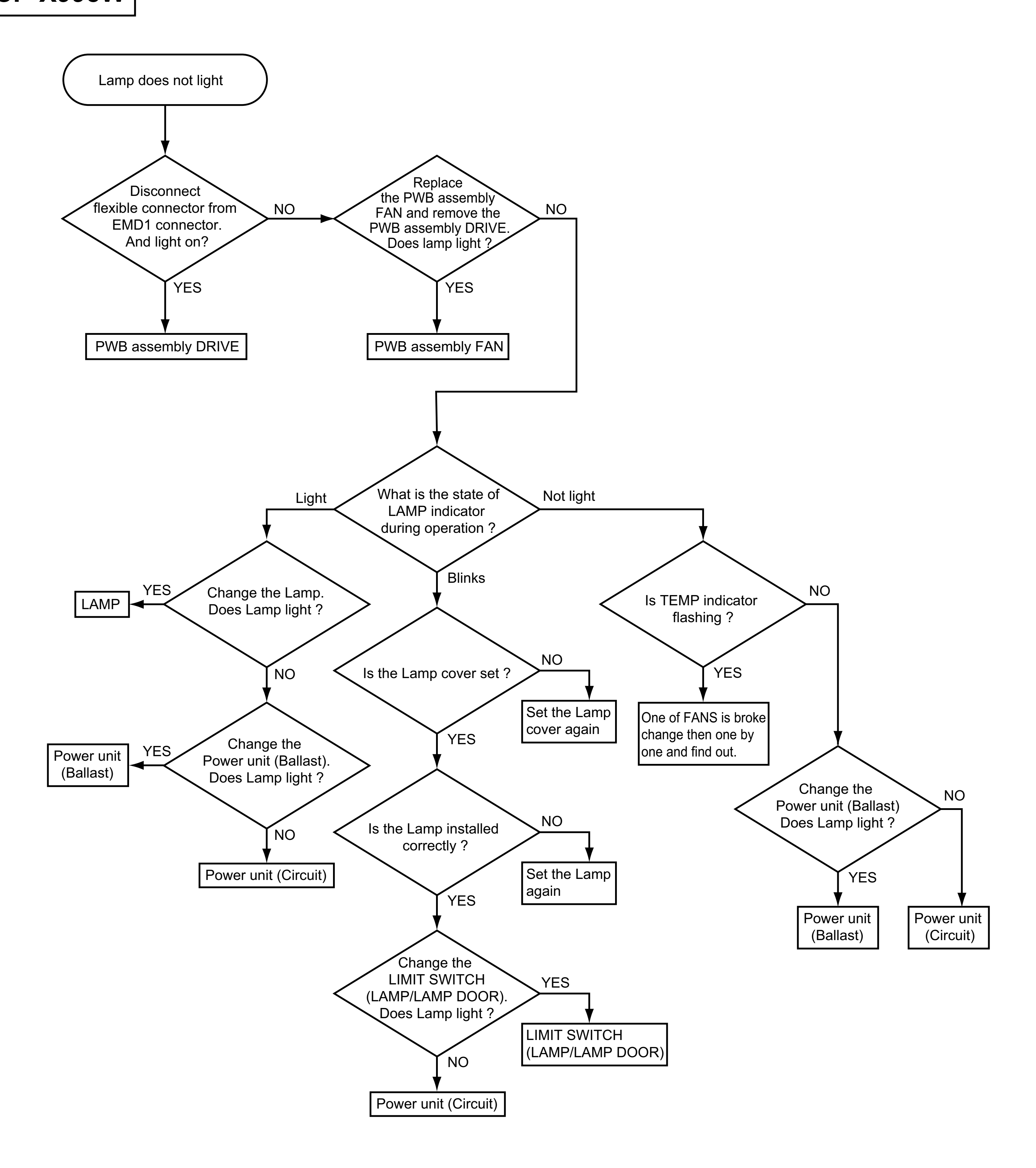
<Top view without upper case>

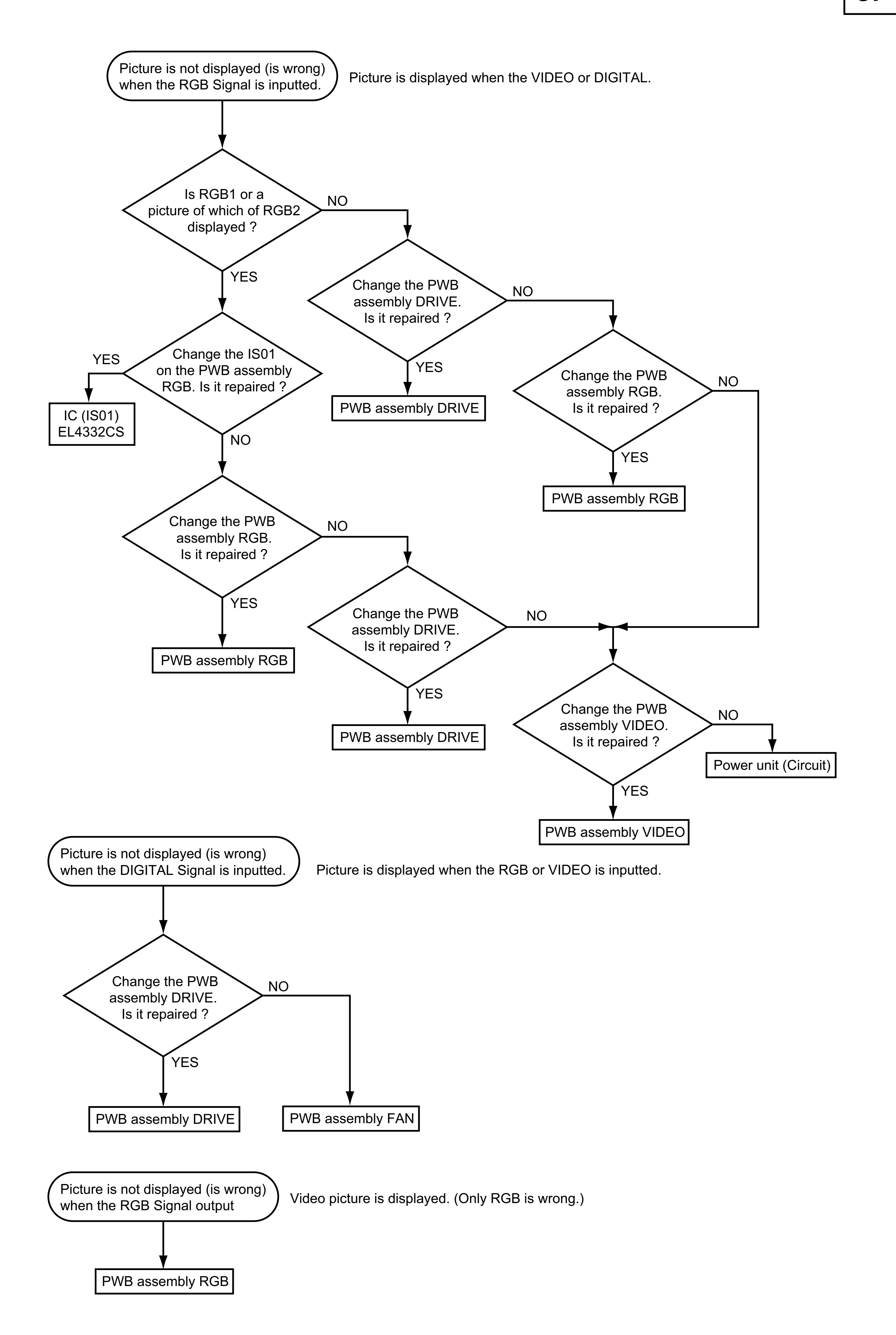
Connectors on the back side of PWB assembly DRIVE are drawn by dotted line.

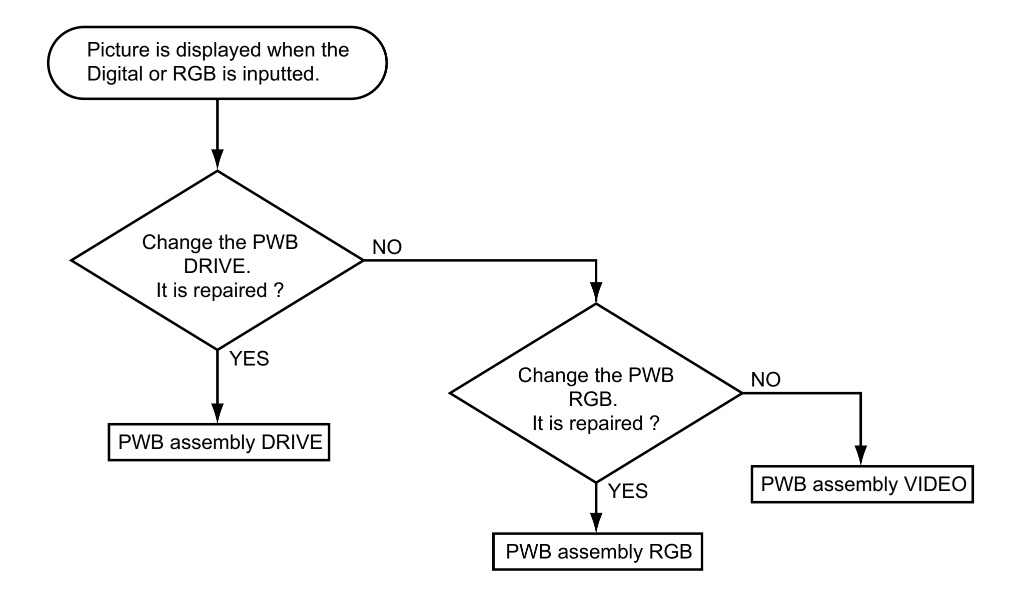
The power supply input of PWB assembly DRIVE

EDS2 Pin No.	Power supply voltage value
1	+9V
2	GND
3	+16.5V
4	GND
5	+5V
6	GND
7	+5V (standby)
8	GND
9	+4.3V
10	
11	
12	GND
13	
14	


Power can not be turned on
Is power LED lit in orange ?
NO
YES
Does Projector turn on by Remote ?
NO
YES
It there sound like "zip" when the Projector turns on ?
NO
Power unit (circuit)
PWB assembly FILTER
FUSE
YES
Change the PWB assembly KEYBOARD. Does power can be turned on ?
NO
PWB assembly DRIVE
YES
PWB assembly KEYBOARD
Disconnect connector from PWB assembly TP-SW. Does projector turn on ?
YES
PWB assembly TEMP
NO
Change the PWB assembly DRIVE. Does power can be turned on ?
NO
YES
PWB assembly DRIVE
Change the PWB assembly VIDEO. Does power can be turned on ?
NO
Power unit (circuit)
YES
PWB assembly VIDEO


Lamp does not light
Disconnect flexible connector from EMD1 connector. And light on?
NO
YES
PWB assembly DRIVE
Replace the PWB assembly FAN and remove the PWB assembly DRIVE. Does lamp light ?
NO
YES
PWB assembly FAN
What is the state of LAMP indicator during operation ?
Light
Not light
Blinks
Change the Lamp. Does Lamp light ?
YES
LAMP
NO
Change the Power unit (Ballast). Does Lamp light ?
YES
Power unit (Ballast)
NO
Power unit (Circuit)
Is the Lamp cover set ?
NO
Set the Lamp cover again
YES
Is the Lamp installed correctly ?
NO
Set the Lamp again
YES
Change the LIMIT SWITCH (LAMP/LAMP DOOR). Does Lamp light ?
YES
LIMIT SWITCH (LAMP/LAMP DOOR)
NO
Power unit (Circuit)
Is TEMP indicator flashing ?
NO
YES
One of FANS is broke change then one by one and find out.
Change the Power unit (Ballast) Does Lamp light ?
NO
YES
Power unit (Ballast)
Power unit (Circuit)


Picture is not displayed (is wrong) when the RGB Signal is inputted.
Picture is displayed when the VIDEO or DIGITAL.
Is RGB1 or a picture of which of RGB2 displayed ?
NO
YES
Change the PWB assembly DRIVE. Is it repaired ?
NO
YES
PWB assembly DRIVE
Change the IS01 on the PWB assembly RGB. Is it repaired ?
YES
IC (IS01) EL4332CS
NO
Change the PWB assembly RGB. Is it repaired ?
NO
YES
PWB assembly RGB
Change the PWB assembly RGB. Is it repaired ?
NO
YES
PWB assembly RGB
Change the PWB assembly DRIVE. Is it repaired ?
NO
YES
PWB assembly DRIVE
Change the PWB assembly VIDEO. Is it repaired ?
NO
Power unit (Circuit)
YES
PWB assembly VIDEO
Picture is not displayed (is wrong) when the DIGITAL Signal is inputted.
Picture is displayed when the RGB or VIDEO is inputted.
Change the PWB assembly DRIVE. Is it repaired ?
NO
YES
PWB assembly DRIVE
PWB assembly FAN
Picture is not displayed (is wrong) when the RGB Signal output
Video picture is displayed. (Only RGB is wrong.)
PWB assembly RGB



Picture is not displayed (is wrong) when the all signals are inputted.

Change the PWB DRIVE. It is repaired ?

NO

YES

PWB assembly DRIVE

Does a start up screen come up ?

NO

YES

Check the DC voltage on EDS2, PWB assembly DRIVE correct ?

YES

LCD Panel

NO

①: +9V
③: +16.5V
⑤: +5V
⑦: +5V(standby)
⑨~⑪: +4.3V

Change the PWB RGB. Is the RGB signal displayed ?

NO

YES

PWB assembly RGB

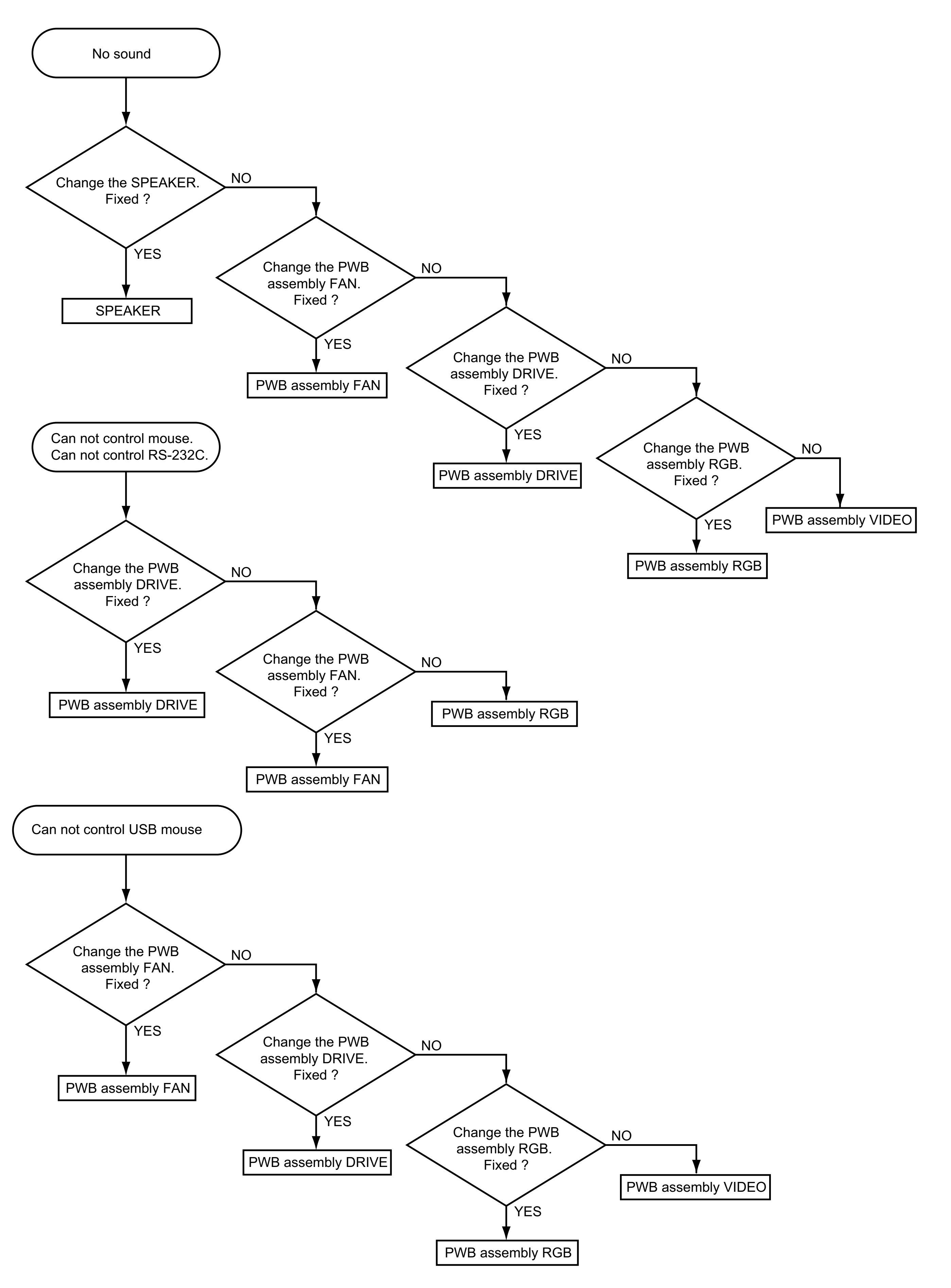
Change the PWB assembly VIDEO. Is the issue fixed ?

NO

Power unit (Circuit)

YES

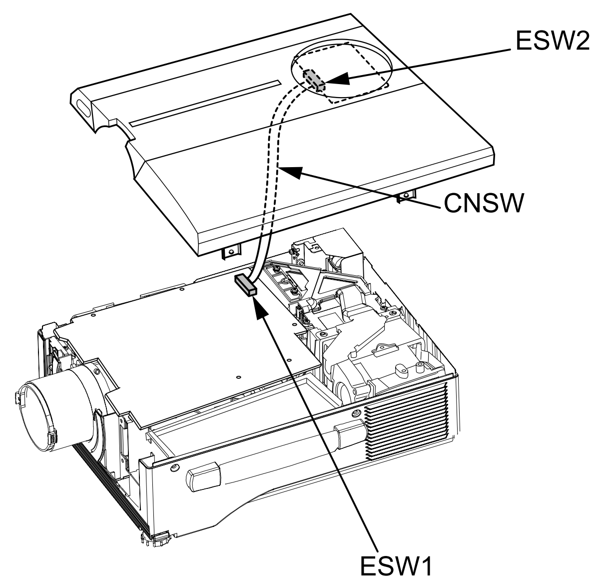
PWB assembly VIDEO


No sound
Change the SPEAKER. Fixed ?
NO
YES
SPEAKER
Change the PWB assembly FAN. Fixed ?
NO
YES
PWB assembly FAN
Change the PWB assembly DRIVE. Fixed ?
NO
YES
PWB assembly DRIVE
Change the PWB assembly RGB. Fixed ?
NO
YES
PWB assembly VIDEO
PWB assembly RGB
Can not control mouse.
Can not control RS-232C.
Change the PWB assembly DRIVE. Fixed ?
NO
YES
PWB assembly DRIVE
Change the PWB assembly FAN. Fixed ?
NO
YES
PWB assembly RGB
PWB assembly FAN
Can not control USB mouse
Change the PWB assembly FAN. Fixed ?
NO
YES
PWB assembly FAN
Change the PWB assembly DRIVE. Fixed ?
NO
YES
PWB assembly DRIVE
Change the PWB assembly RGB. Fixed ?
NO
YES
PWB assembly VIDEO
PWB assembly RGB

6. Service points

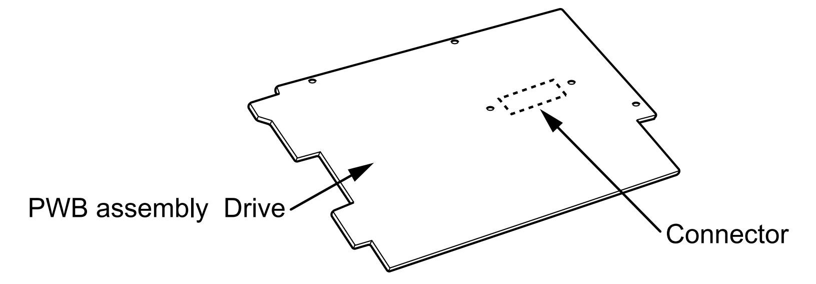
● Cautions when removing the Upper case

In the Upper case, an operation PWB is installed. When removing, lift carefully without using excessive force to prevent damaging the ESW1 and ESW2 connector.



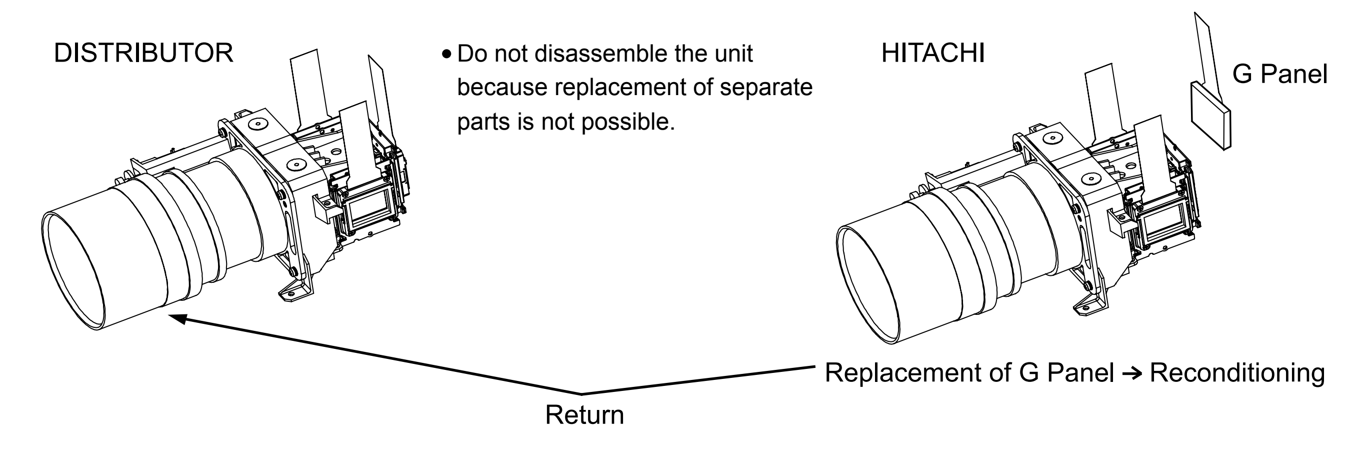
● Cautions when removing the drive PWB

When removing the drive PWB, there is danger of damaging the connector connecting the fan PWB. Lift up the part near the drive PWB connector and disconnect the connector before removing the drive PWB.



● Before Replacing the LCD / Lens Prism

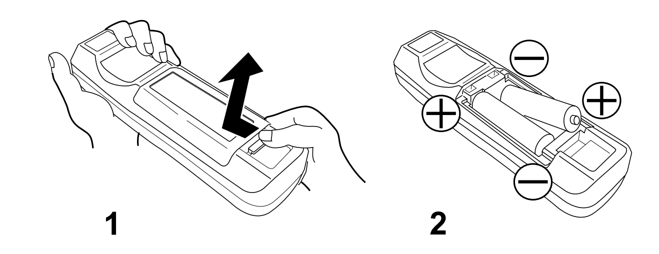
You should not replace separately the parts of the liquid crystal LCD / Lens Prism because it works properly only when used together. Therefore, regarding these parts, you can either replace part , LCD / Lens Prism assembly, or send the whole unit LCD / Lens Prism assembly back to HITACHI, where we will replace the malfunctioning part, recondition the device and send it back to you.

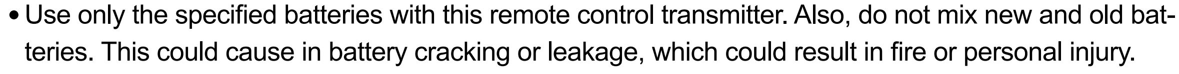


● Loading the Batteries

Install the AA batteries into the remote control transmitter.

1. Remove the battery cover.
   Push the knob while lifting up the battery cover.
2. Loading the batteries.
   Make sure the plus and minus poles are correctly oriented.
3. Close the battery cover.





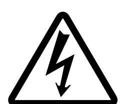


CAUTION

- Use only the specified batteries with this remote control transmitter. Also, do not mix new and old batteries. This could cause in battery cracking or leakage, which could result in fire or personal injury.
- When loading the batteries, make sure the plus and minus terminals are correctly oriented as indicated in the remote control transmitter. Incorrect orientation could cause battery cracking or leakage, which could result in personal injury or pollution of the surrounding environment.
- When you dispose the battery, you should obey the law in the relative area or country.
- Keep the battery away from children and pets.
- When not to be used for an extended period, remove the batteries from the remote control transmitter.

NOTE: Replace the batteries when remote control transmitter operation becomes difficult.

● Lamp (Option Lamp: DT00491)

HIGH VOLTAGE
HIGH TEMPERATURE
HIGH PRESSURE

Contact your dealer before replacing the lamp.
Before replacing the lamp, switch power OFF, remove the power cord from the power outlet, and wait 45 minutes until the lamp has cooled. The lamp may explode if handled at high temperatures.



WARNING

- For disposal of used lamp, treat according to the instruction of community authorities.
- Since the lamp is made of glass, do not apply shock to it and do not scratch it.
- Also, do not use old lamp. This could also cause explosion of the lamp.
- Premature lamp failure MAY be caused by an electronic component in the projector and not necessarily the lamp. If unsure contact your local service center.
- If it is probable that the lamp has exploded (explosive sound is heard), disconnect the power plug from the power outlet and ask your dealer to replace lamp. The lamp is covered by front glass, but in rare cases, the reflector and the inside of the projector may be damaged by scattered broken pieces of glass, and broken pieces could cause injury when being handled.
- Do not use the projector with the lamp cover removed.

Lamp

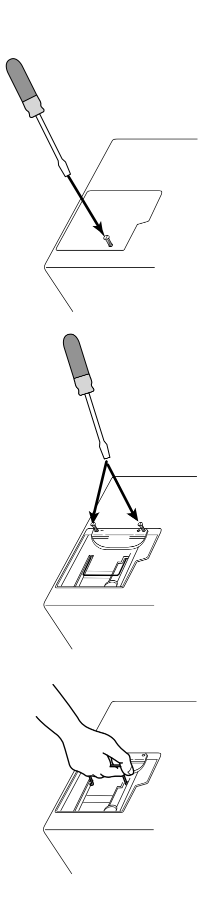
Reflector
Front glass

Lamp Life

Projector lamps have a finite life. The image will become darker, and hues will become weaker, after a lamp has been used for a long period of time.
Replace the lamp if the LAMP indicator is red, or the CHANGE THE LAMP message appears when the projector is switched ON.

NOTE: The LAMP indicator is also red when the lamp unit reaches high temperature. Before replacing the lamp, switch power OFF, wait approximately 20 minutes, and switch power ON again.
If the LAMP indicator is still red, replace the lamp.

Replacing the Lamp



1. Switch the projector OFF, remove the power cord from the power outlet, and wait at least 45 minutes for the unit to cool.
2. Prepare a new lamp.
3. Check that the projector has cooled sufficiently, and gently turn it upside down.
4. Loosen the two screws as shown in the diagram, and remove the lamp cover.
5. Loosen the two screws, and gently remove the lamp while holding the grips. Touching the inside of the lamp case may result in uneven coloring.
6. Install the new lamp and tighten the two screws firmly. Also steadily push the opposite side of the screwed lamp into the unit.
7. Replace the lamp cover in position and tighten the screw firmly.
8. Gently turn the projector right-side up.



CAUTION

- Ensure that screws are tightened properly. Screws not tightened fully may result in injury or accidents.
- Do not use the projector with the lamp cover removed.

Resetting the Lamp Timer

Reset the lamp timer after replacing the lamp. When the lamp has been replaced after the LAMP indicator is red, or the CHANGE THE LAMP message is displayed, complete the following operation within 10 minutes of switching power ON. The power will be turned off automatically in over 10 minutes.

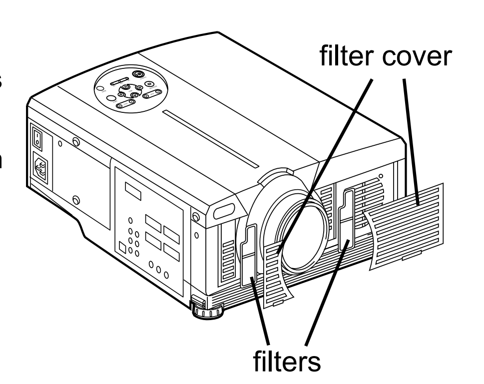
1. Switch power ON, and press the RESET button, for approximately three seconds. The 'LAMP xxxx hr' message will appear on the lamp timer on the bottom of the screen.
2. Press the MENU button on the remote control transmitter, or the RESET button on the control panel, while the lamp timer is displayed. The 'LAMP xxxx □ → 0 ■ CANCEL' message will then appear.
3. Press the ◄ and select 0, and wait until the timer display is cleared.

NOTE: Do not reset the lamp timer without replacing the lamp. Reset the lamp timer always when replacing the lamp. The message functions will not operate properly if the lamp timer is not reset correctly.

● Air Filters

Cleaning the Air filters

This projector uses 2 air filters. These air filters should be cleaned as described below at intervals of approximately 100 hours.



1. Switch the projector power supply OFF, and remove the power cord from the power outlet.
2. Remove the filter cover and the air filter.
3. Clean the air filter with a vacuum cleaner.
4. Set the air filter and the filter cover.

Replacing the Air filter

Replace the air filter if contamination cannot be removed, or if it is damaged.

1. Switch the projector power supply OFF, and remove the power cord from the power outlet.
2. Remove the filter cover and the old filter.
3. Set the new filter and filter cover.



CAUTION

- Switch power OFF and remove the power cord from the power outlet before beginning maintenance work. Please read the separate “SAFETY INSTRUCTIONS” thoroughly to ensure that maintenance is performed correctly.
- Replace the air filter if contamination cannot be removed, or if it is damaged. Contact your dealer in such case.(Option Air filter : MN04531)
- Do not use the equipment with the air filter removed.
- When the air filter is clogged with dust etc. the power supply is switched OFF automatically to prevent the temperature rising inside the projector.

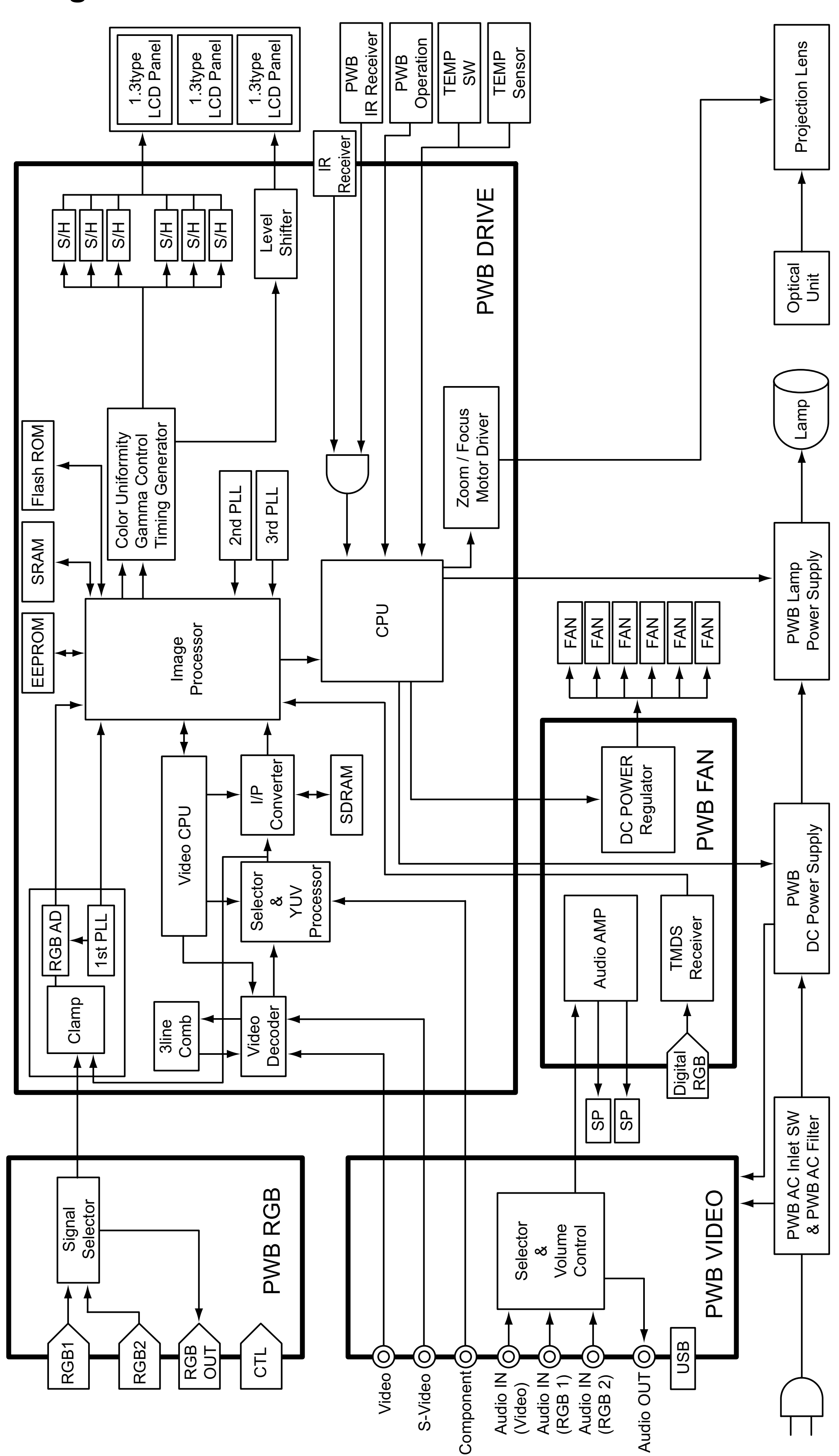
● High-altitude Operation Mode

When using the unit in low atmospheric pressure areas, you can boost the fan speed to increase cooling efficiency.

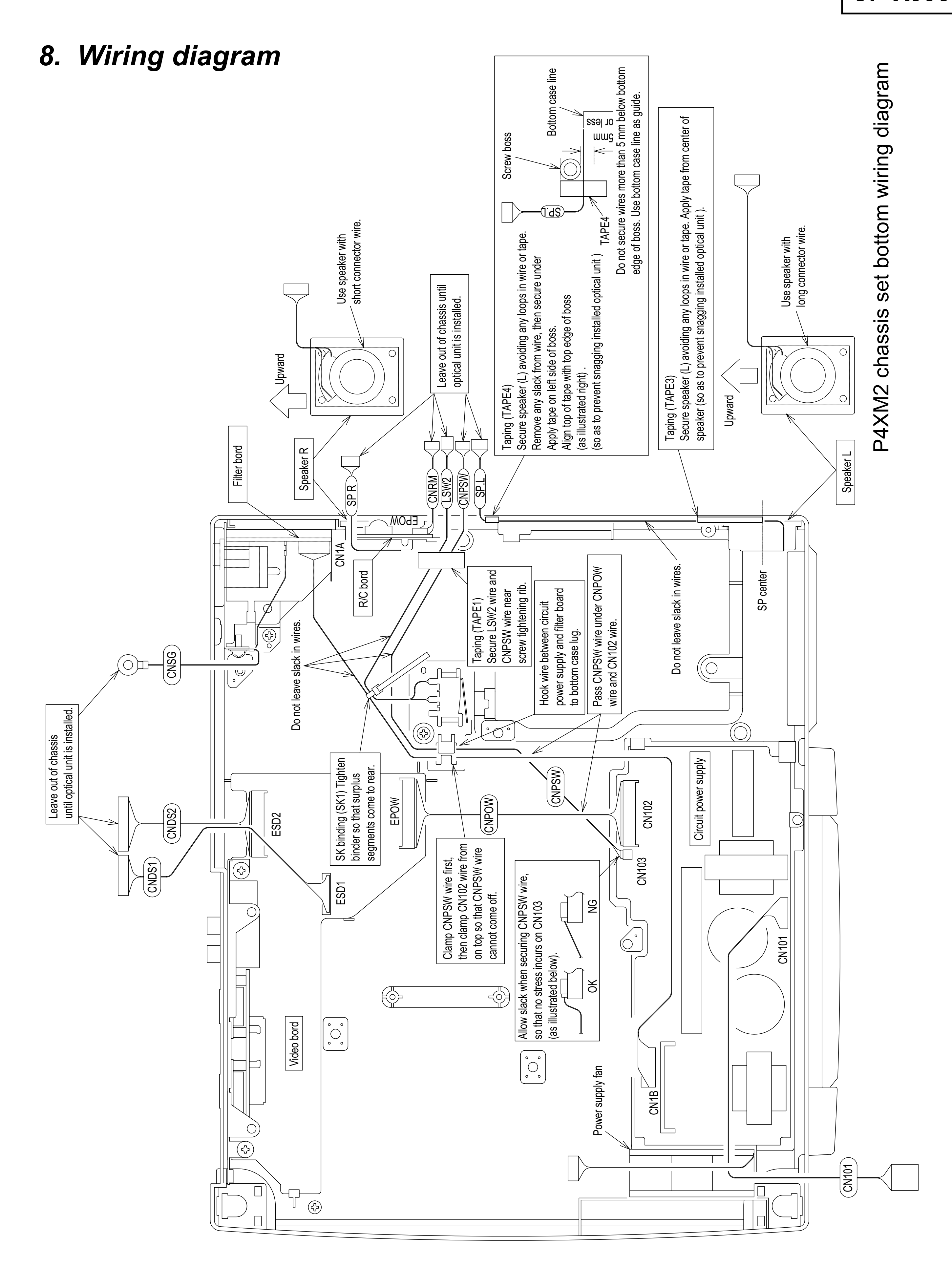
1. While video is being displayed, press the MENU button on the remote control, and, while OPT item in the menu stays selected, press and hold down the MAGNIFY OFF button for 3 seconds.
2. The FAN SPEED Switch menu is displayed. Set up the fan speed by selecting NORMAL/HIGH.

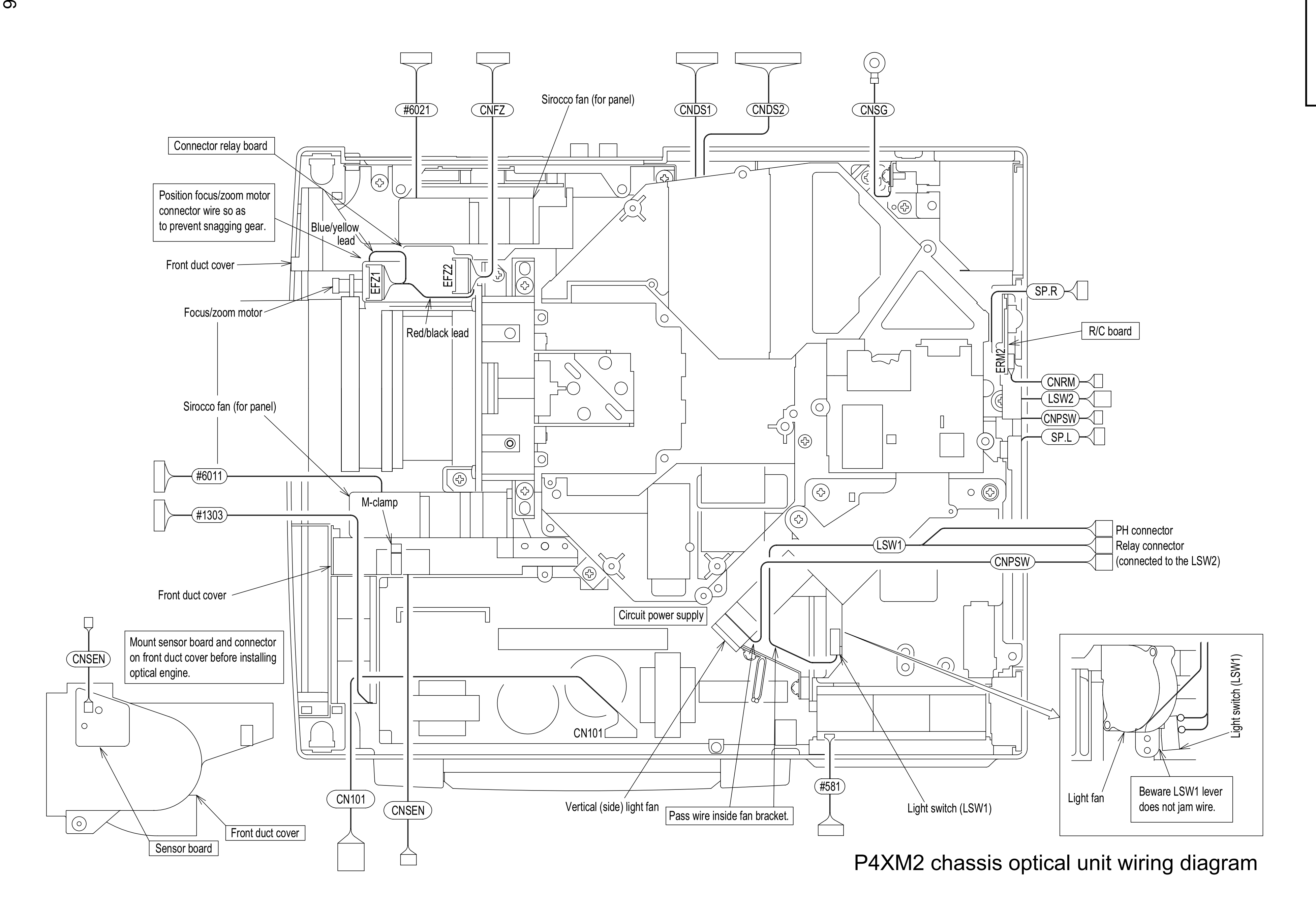
*When you want to change the setting again, repeat the same procedure.

7. Block diagram

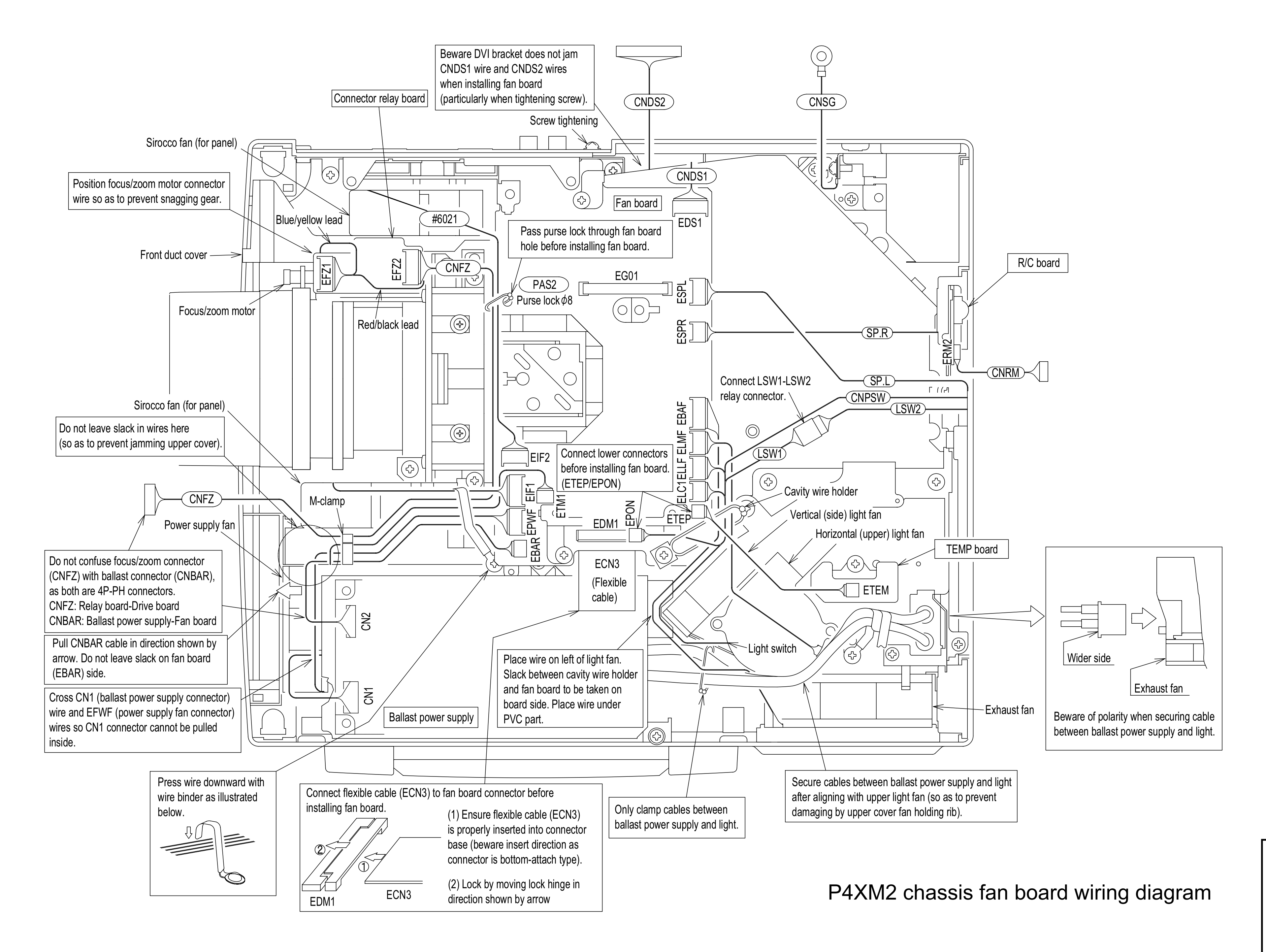


8. Wiring diagram

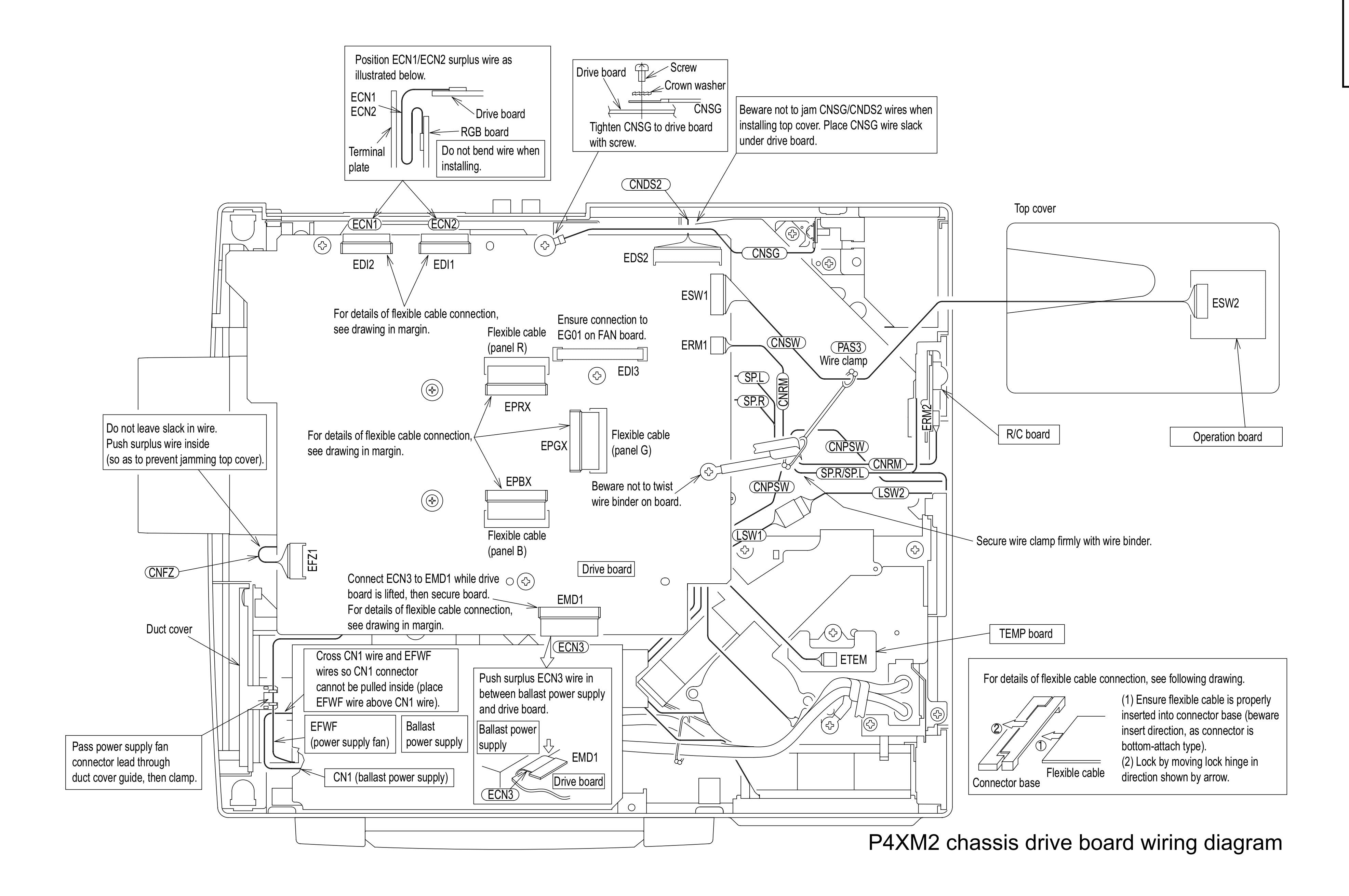




P4XM2 chassis optical unit wiring diagram



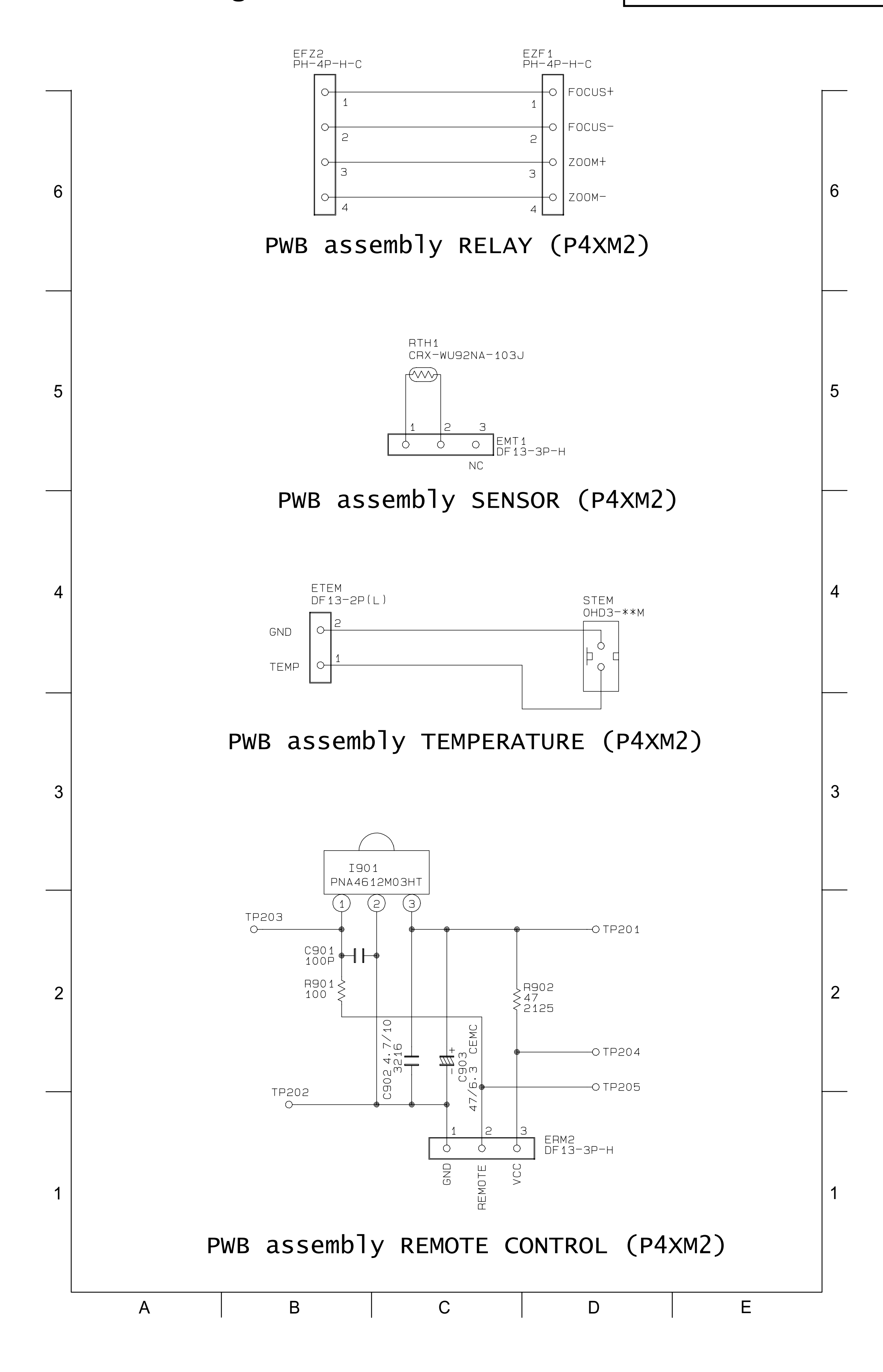
P4XM2 chassis fan board wiring diagram

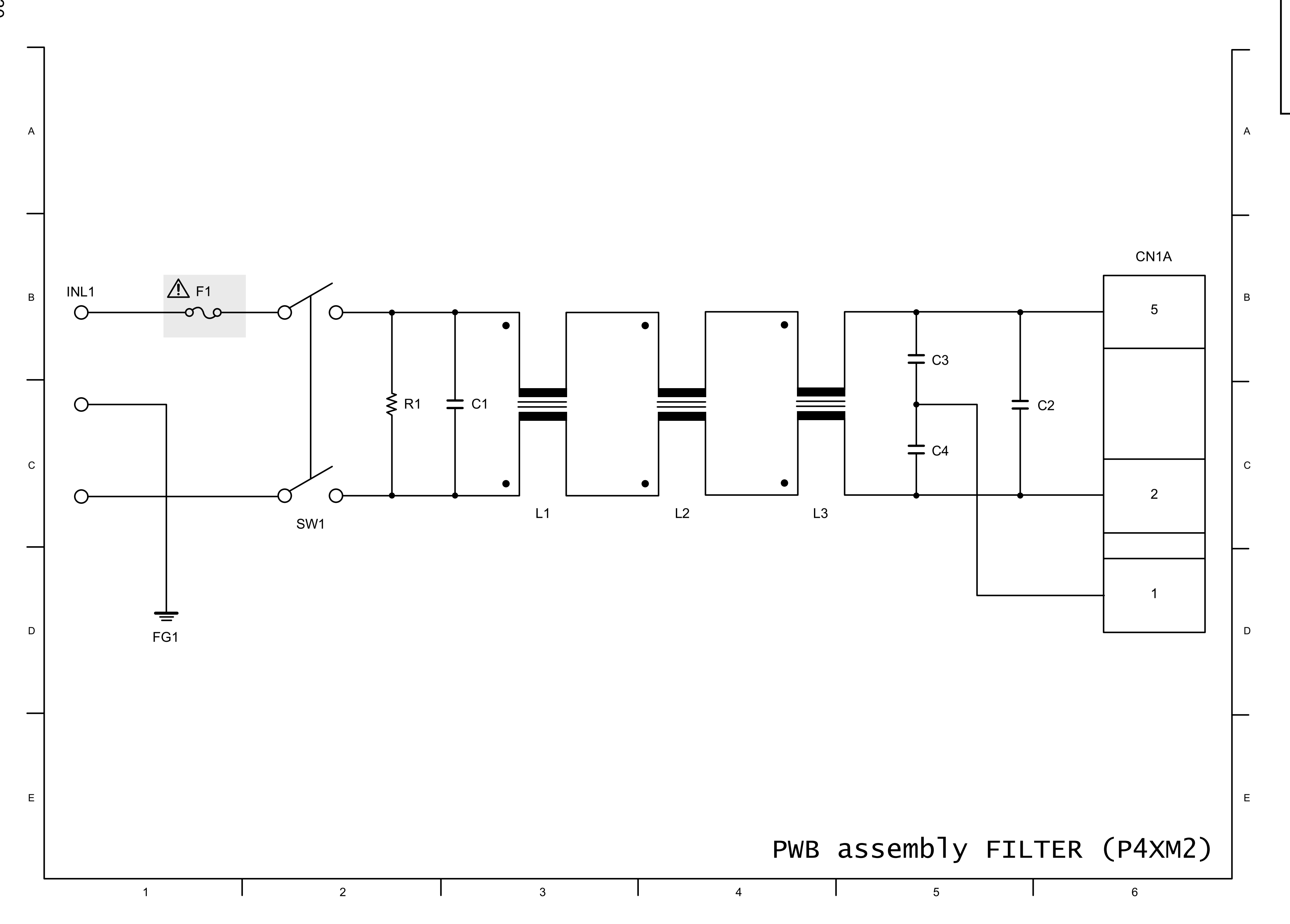


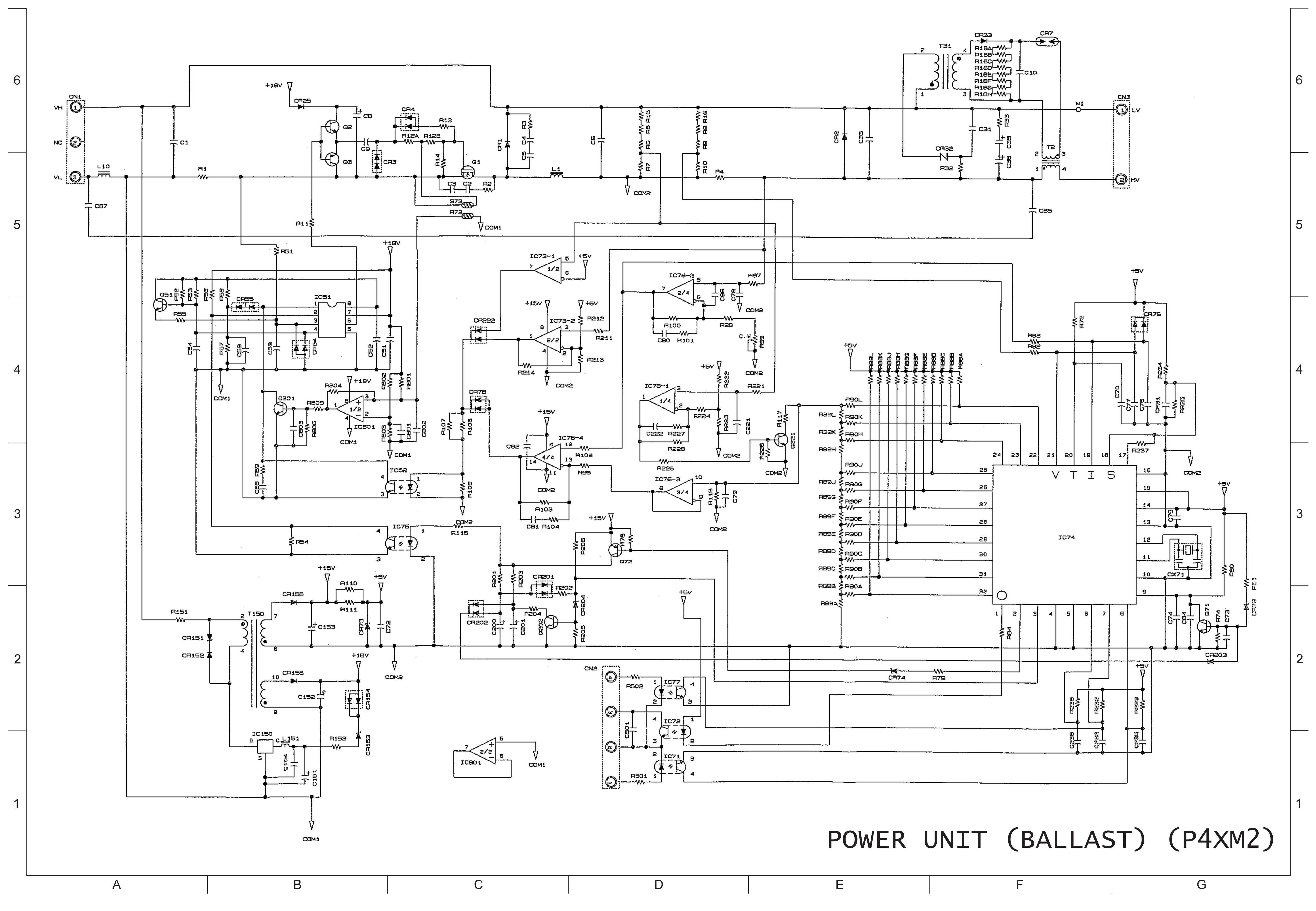
P4XM2 chassis drive board wiring diagram

9. Basic circuit diagram

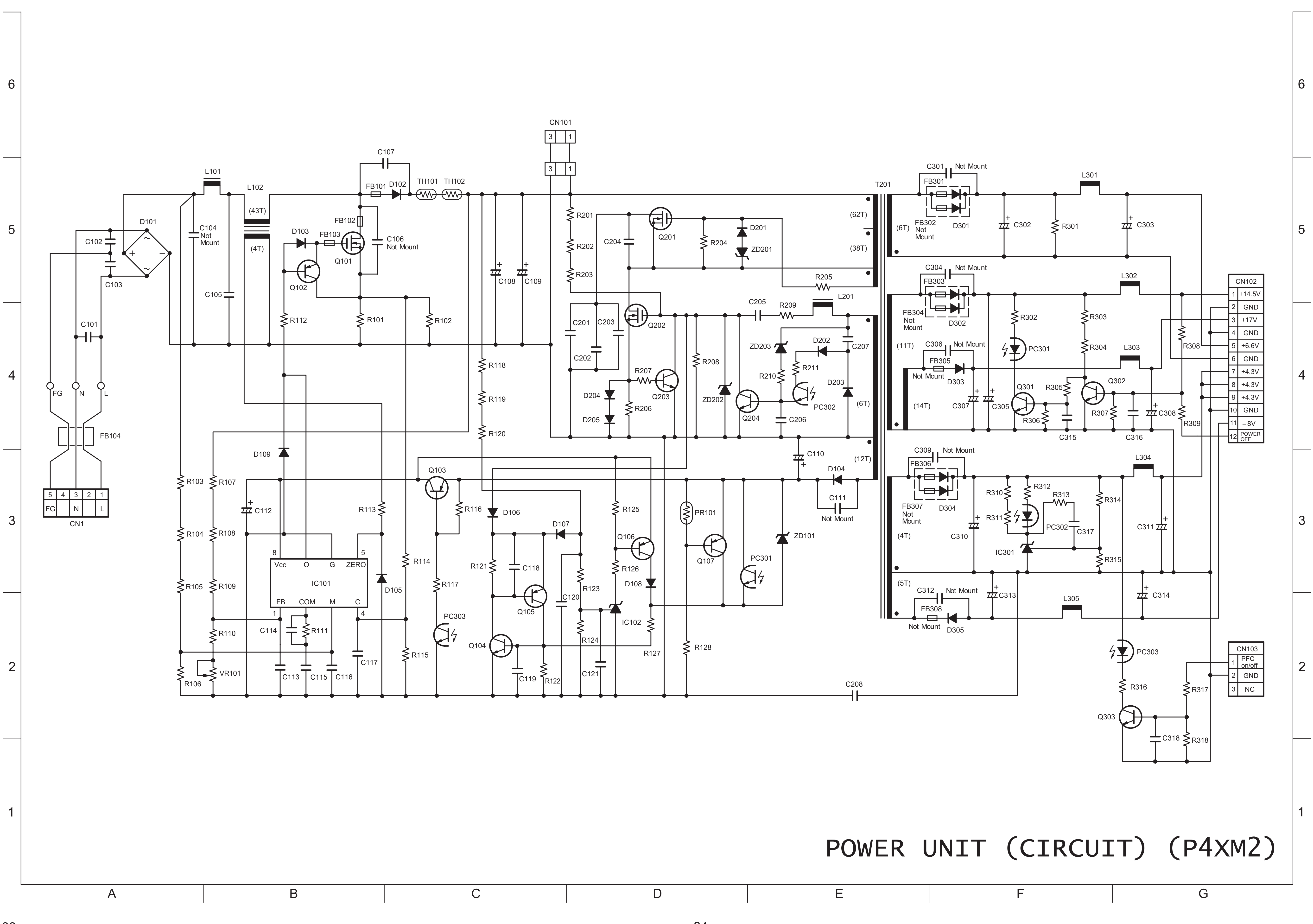
Parts with hatching are not mounted.



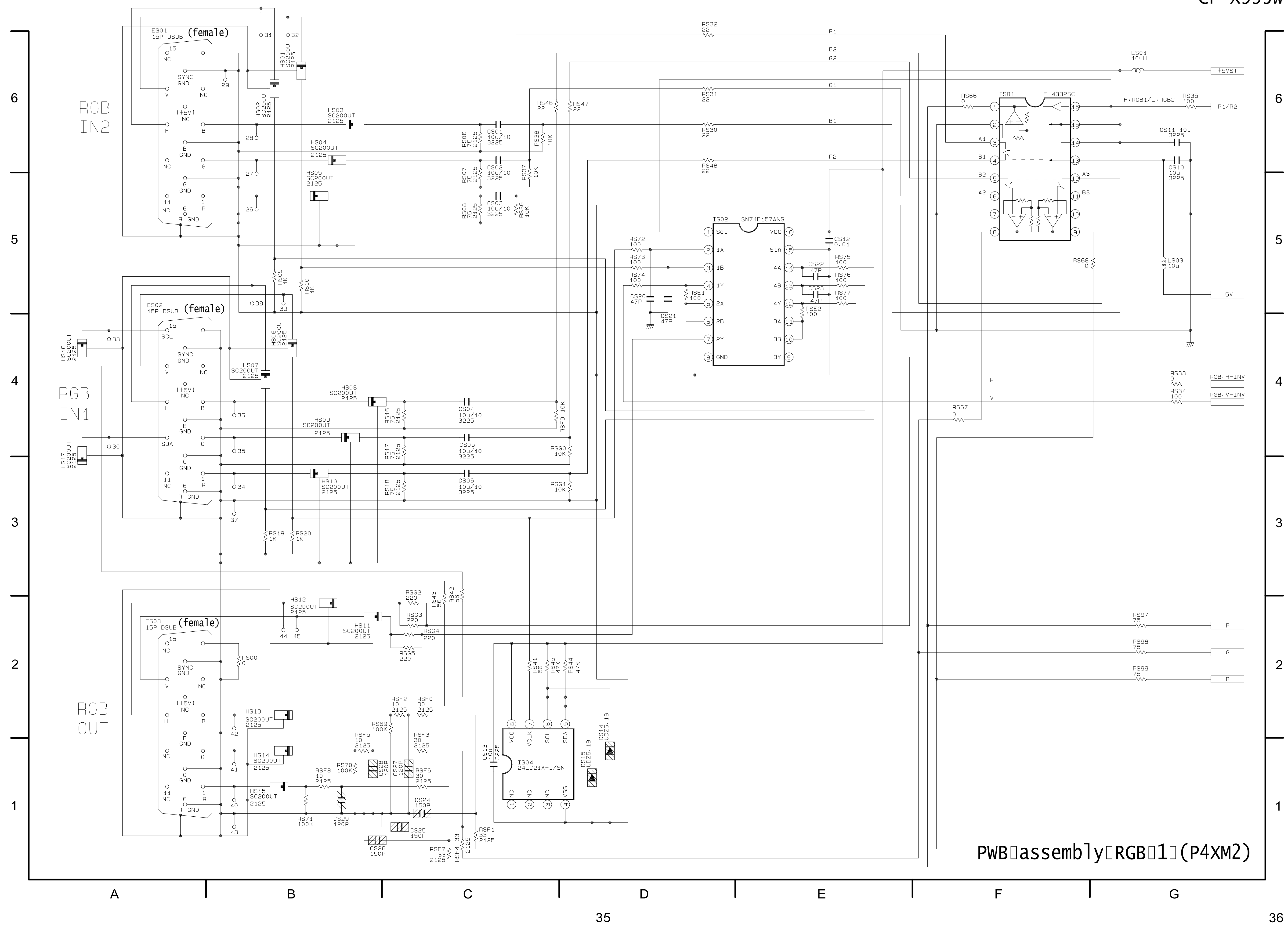

INL1
F1
SW1
FG1
R1
C1
L1
L2
L3
C3
C4
C2
CN1A
5
2
1
A
B
C
D
E
1
2
3
4
5
6
PWB assembly FILTER (P4XM2)

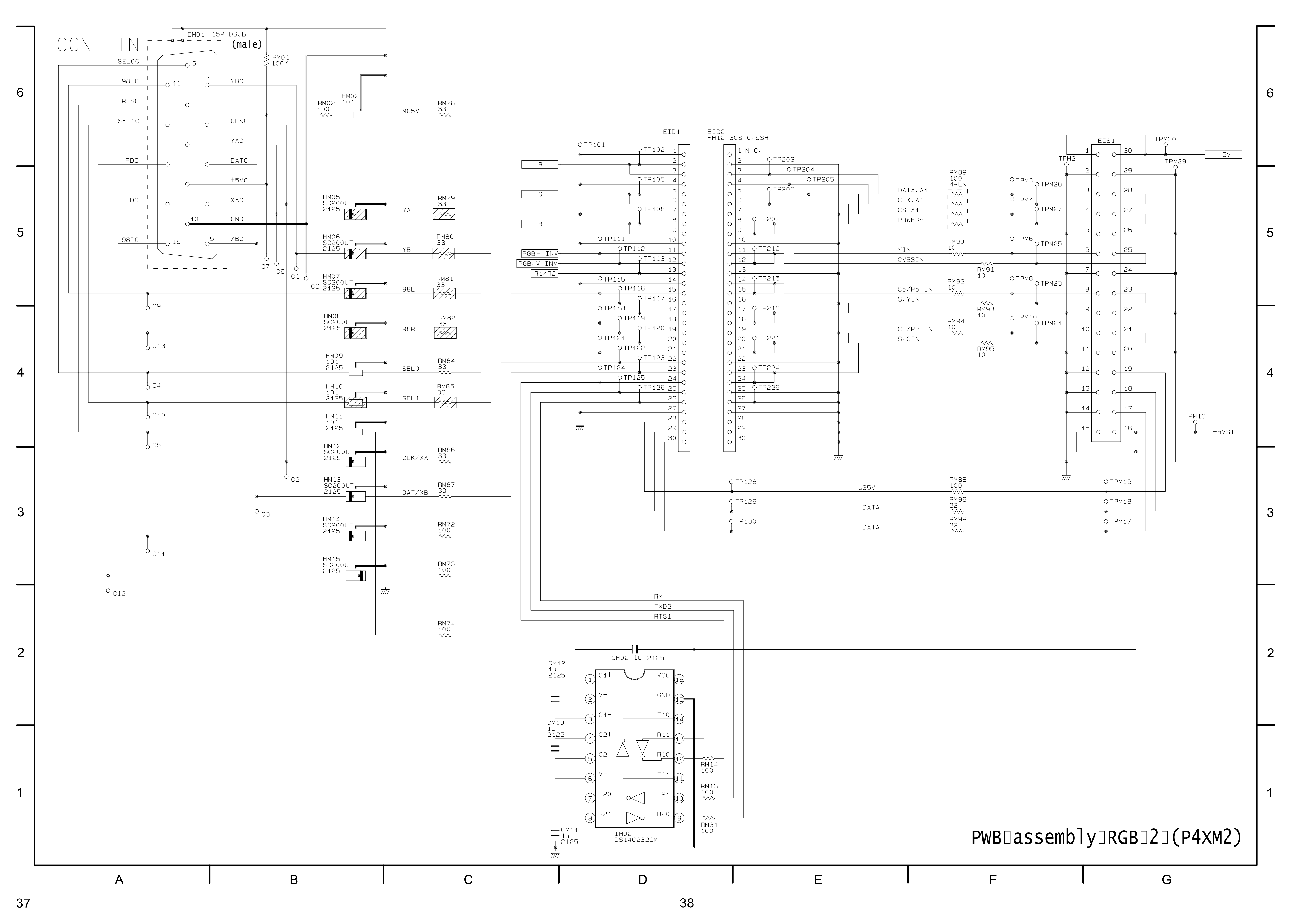


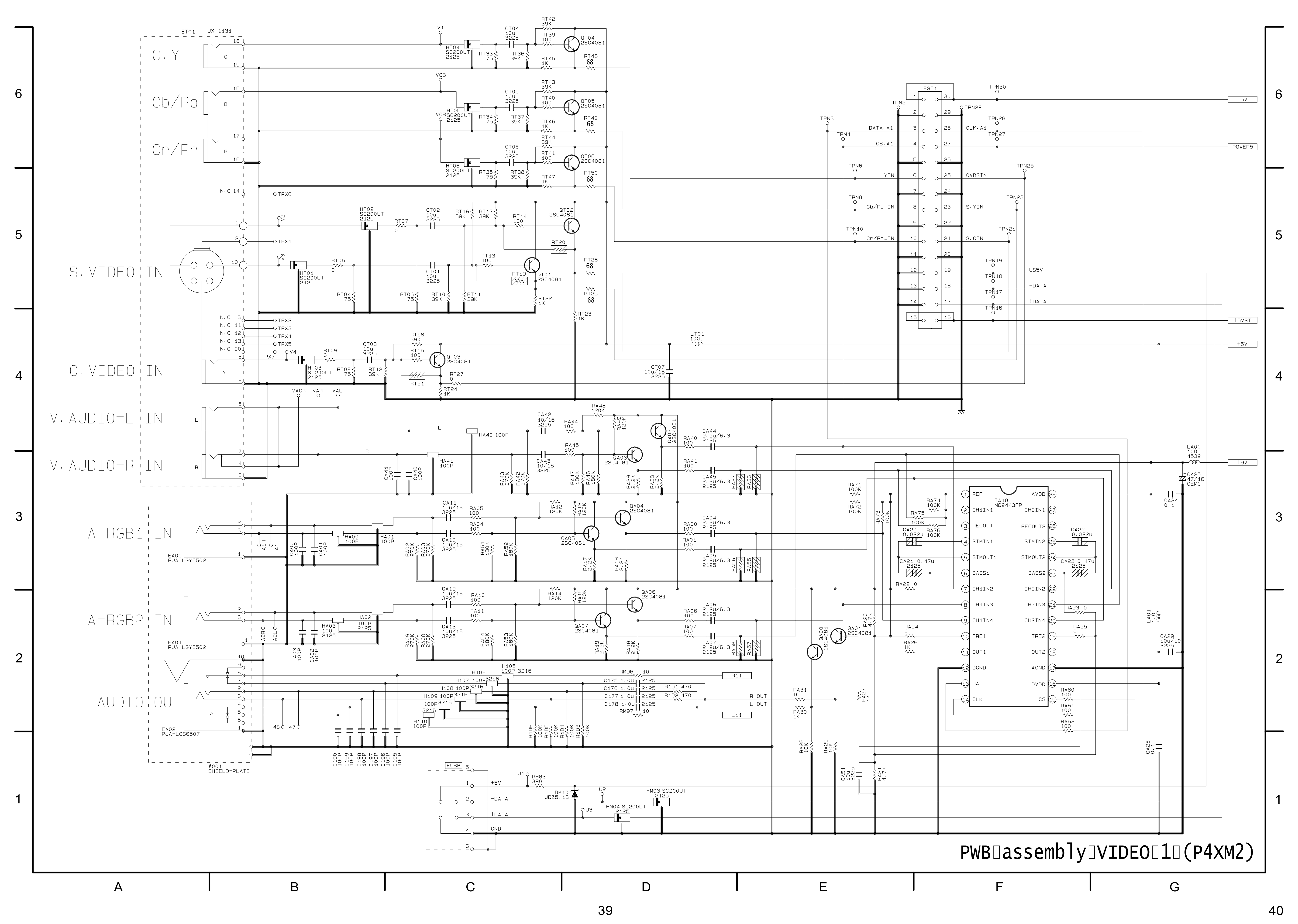
POWER UNIT (BALLAST) (P4XM2)



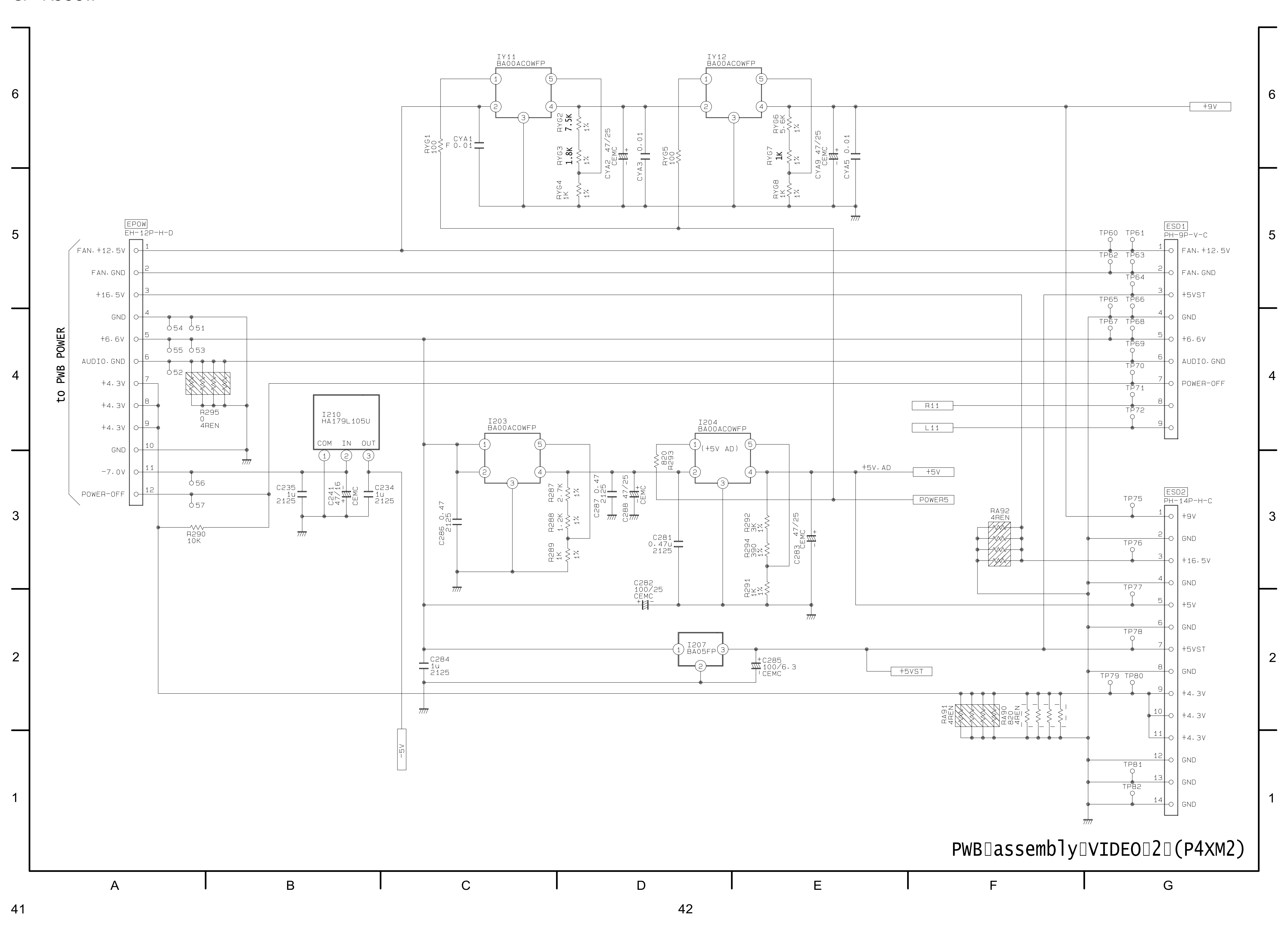
POWER UNIT (CIRCUIT) (P4XM2)


RGB IN2
RGB IN1
RGB OUT
ES01 15P DSUB (female)
ES02 15P DSUB (female)
ES03 15P DSUB (female)
IS01 EL4332SC
IS02 SN74F157ANS
IS04 24LC21A-I/SN
+5VST
R1/R2
-5V
RGB.H-INV
RGB.V-INV
R
G
B
H:RGB1/L:RGB2
PWB assembly RGB 1 (P4XM2)

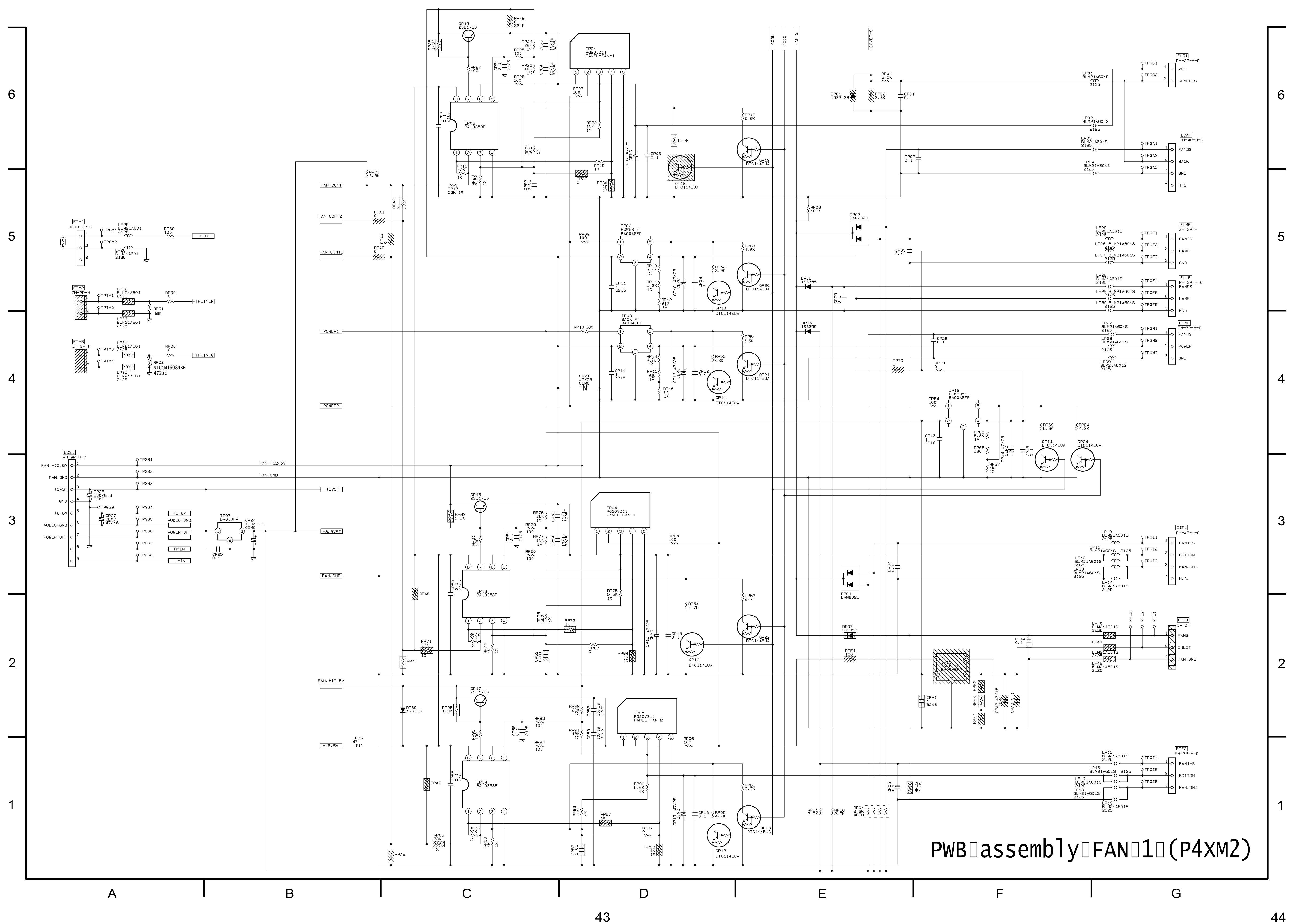

CONT IN
EM01 15P DSUB
(male)
EID1
EID2
FH12-30S-0.5SH
EIS1
IM02
DS14C232CM
-5V
+5VST
RX
TXD2
RTS1
US5V
-DATA
+DATA
DATA.A1
CLK.A1
CS.A1
POWER5
YIN
CVBSIN
Cb/Pb IN
S.YIN
Cr/Pr IN
S.CIN
SELOC
98LC
RTSC
SEL1C
RDC
TDC
98RC
YBC
CLKC
YAC
DATC
+5VC
XAC
GND
XBC
M05V
YA
YB
98L
98R
SEL0
SEL1
CLK/XA
DAT/XB
R
G
B
RGB.H-INV
RGB.V-INV
R1/R2
CM02 1u 2125
PWB assembly RGB 2 (P4XM2)

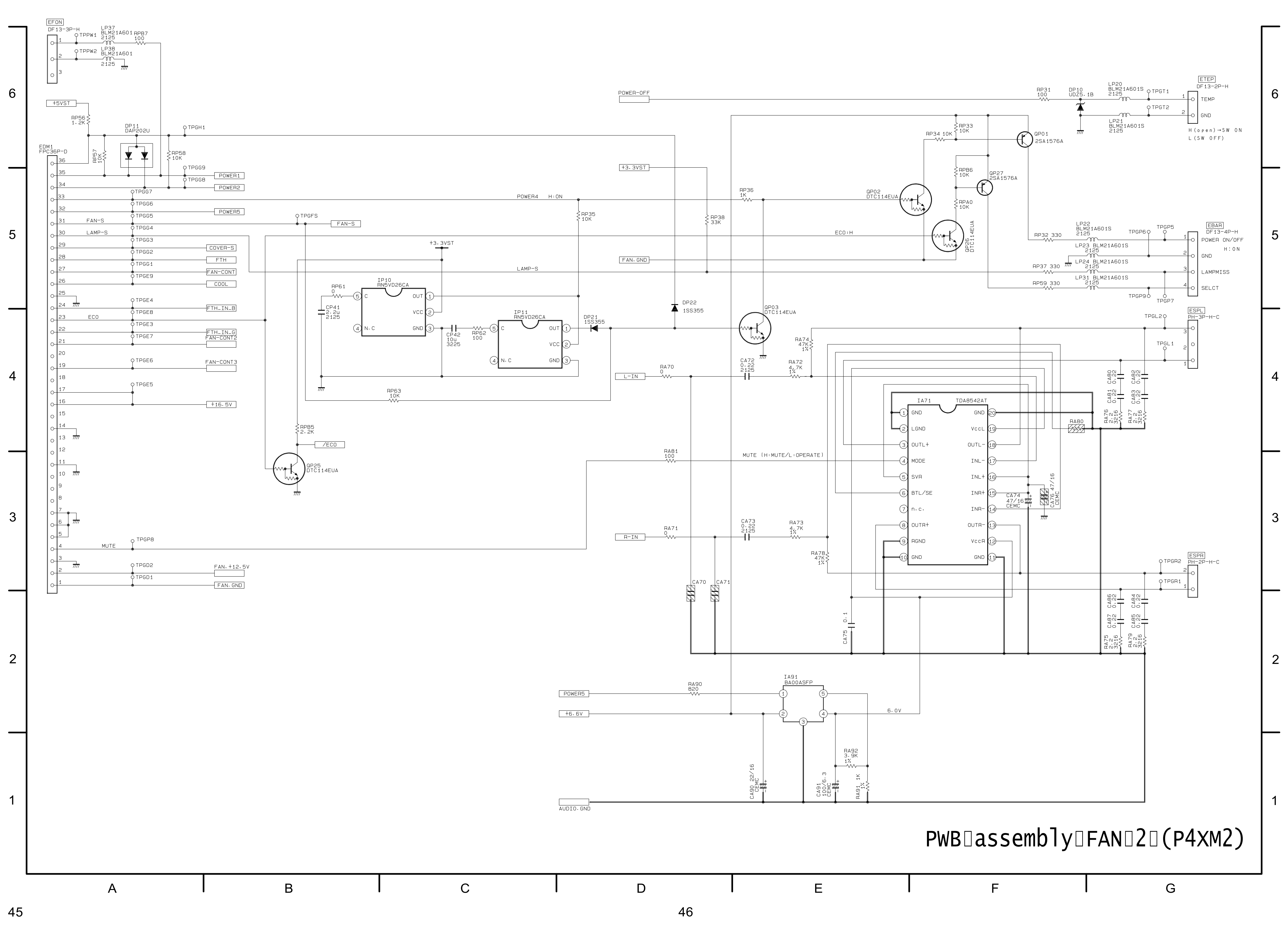


PWB assembly VIDEO 1 (P4XM2)

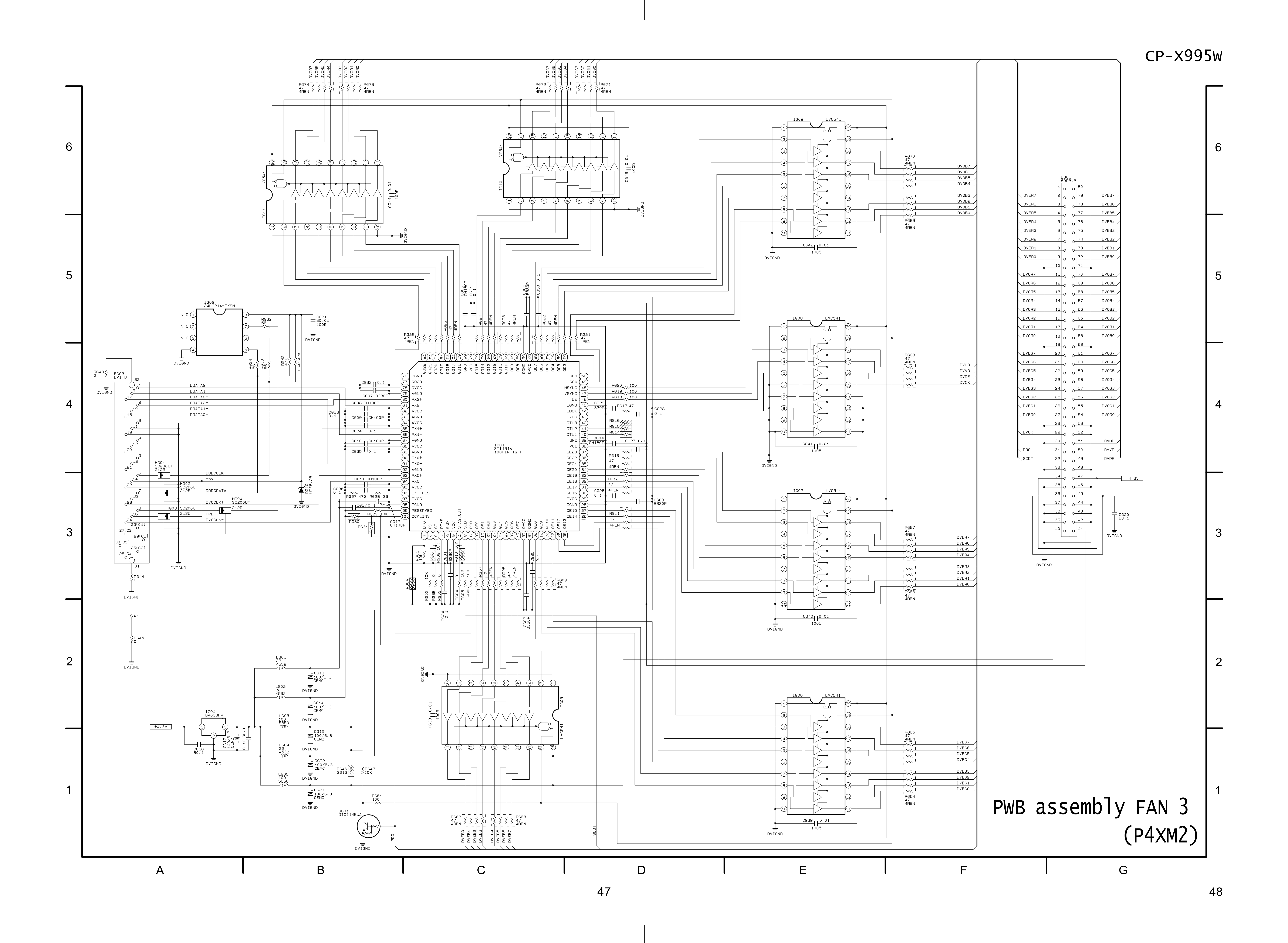


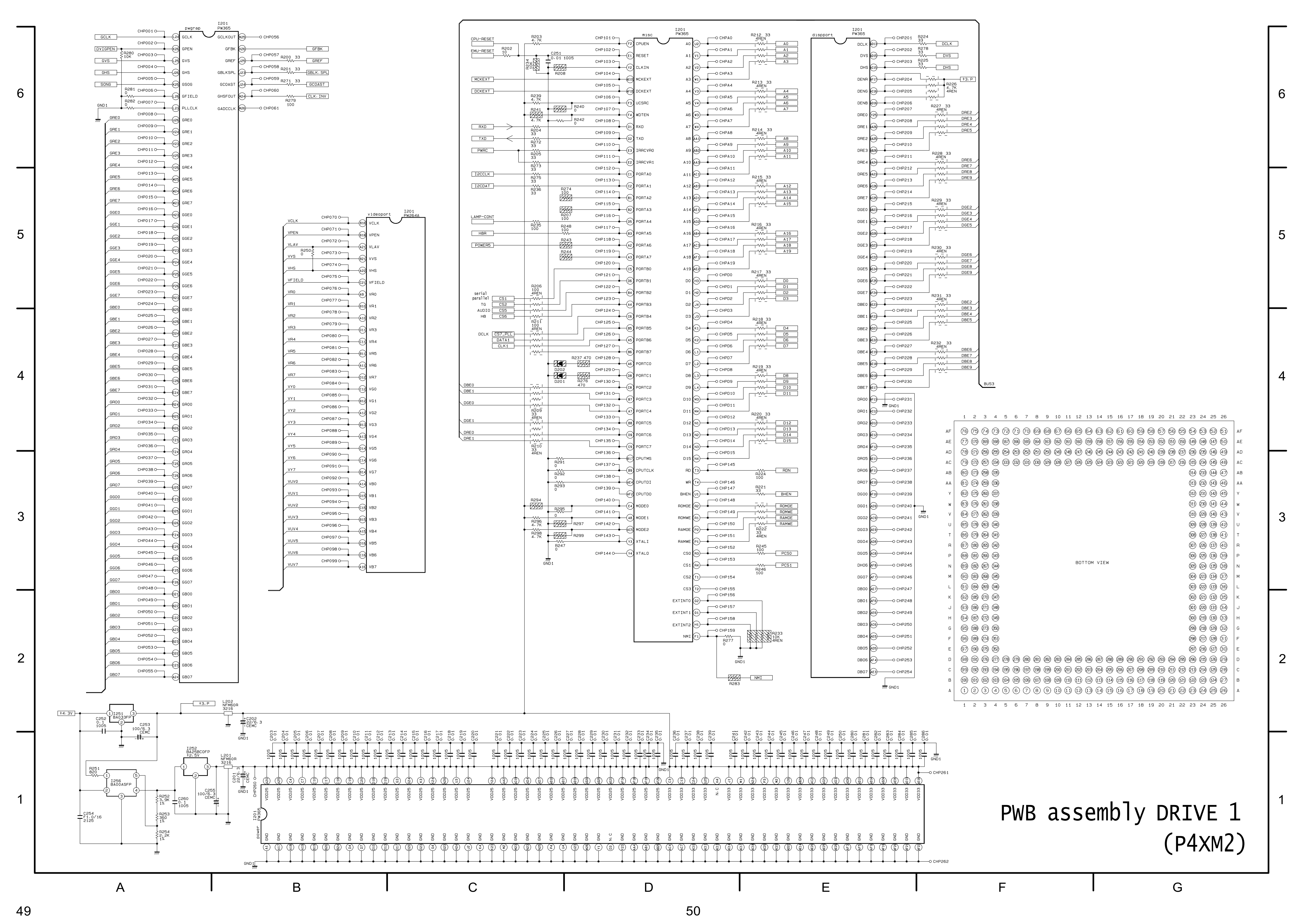
PWB assembly VIDEO 2 (P4XM2)
to PWB POWER
EPOW
EH-12P-H-D
ESD1
PH-9P-V-C
ESD2
PH-14P-H-C
IY11
BA00ACOWFP
IY12
BA00ACOWFP
I203
BA00ACOWFP
I204
BA00ACOWFP
I210
HA179L105U
I207
BA05FP
FAN.+12.5V
FAN.GND
+16.5V
GND
+6.6V
AUDIO.GND
+4.3V
-7.0V
POWER-OFF
+5VST
+9V
+5V
+5V.AD
POWER5
R11
L11
-5V

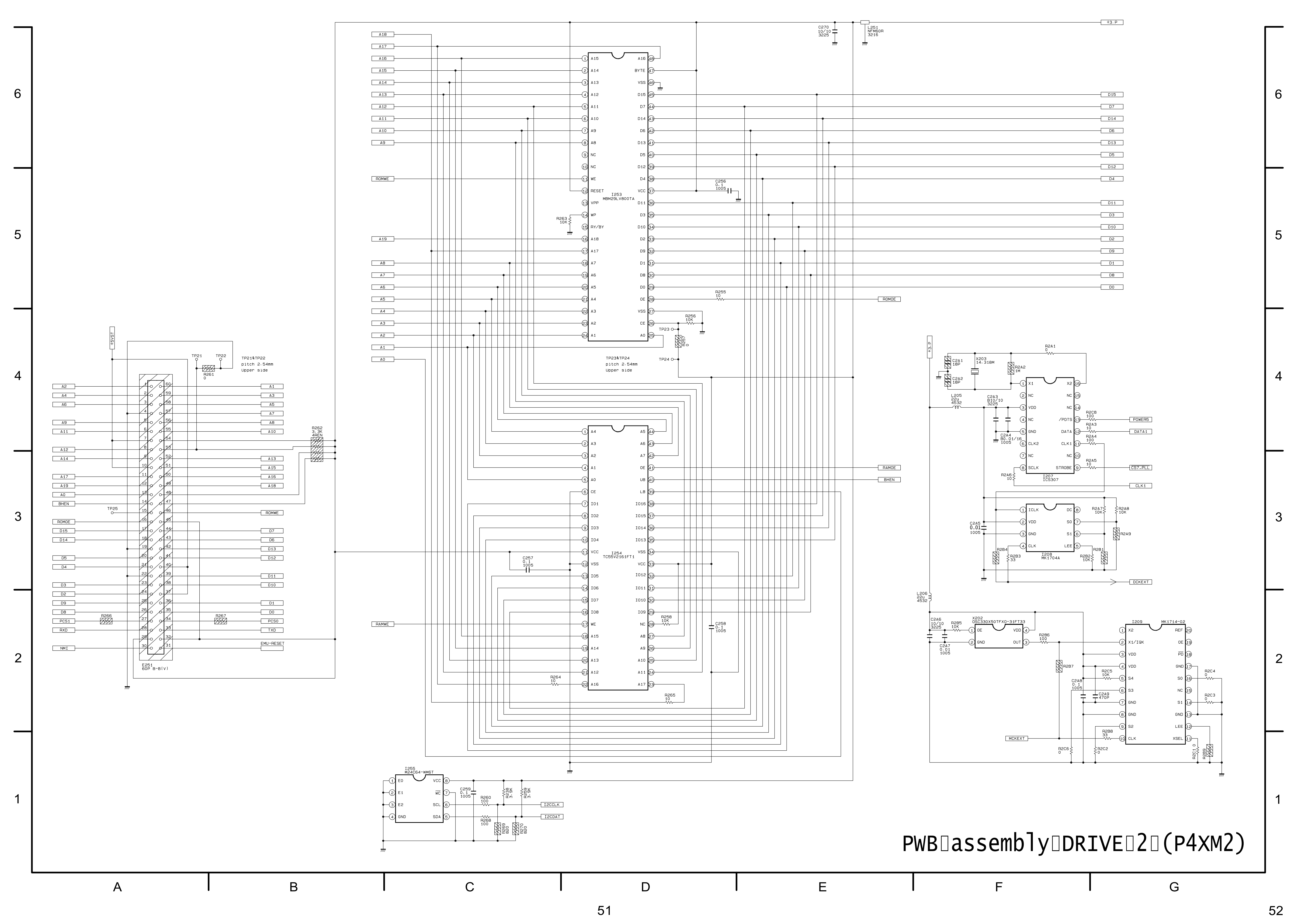

PWB assembly FAN 1 (P4XM2)



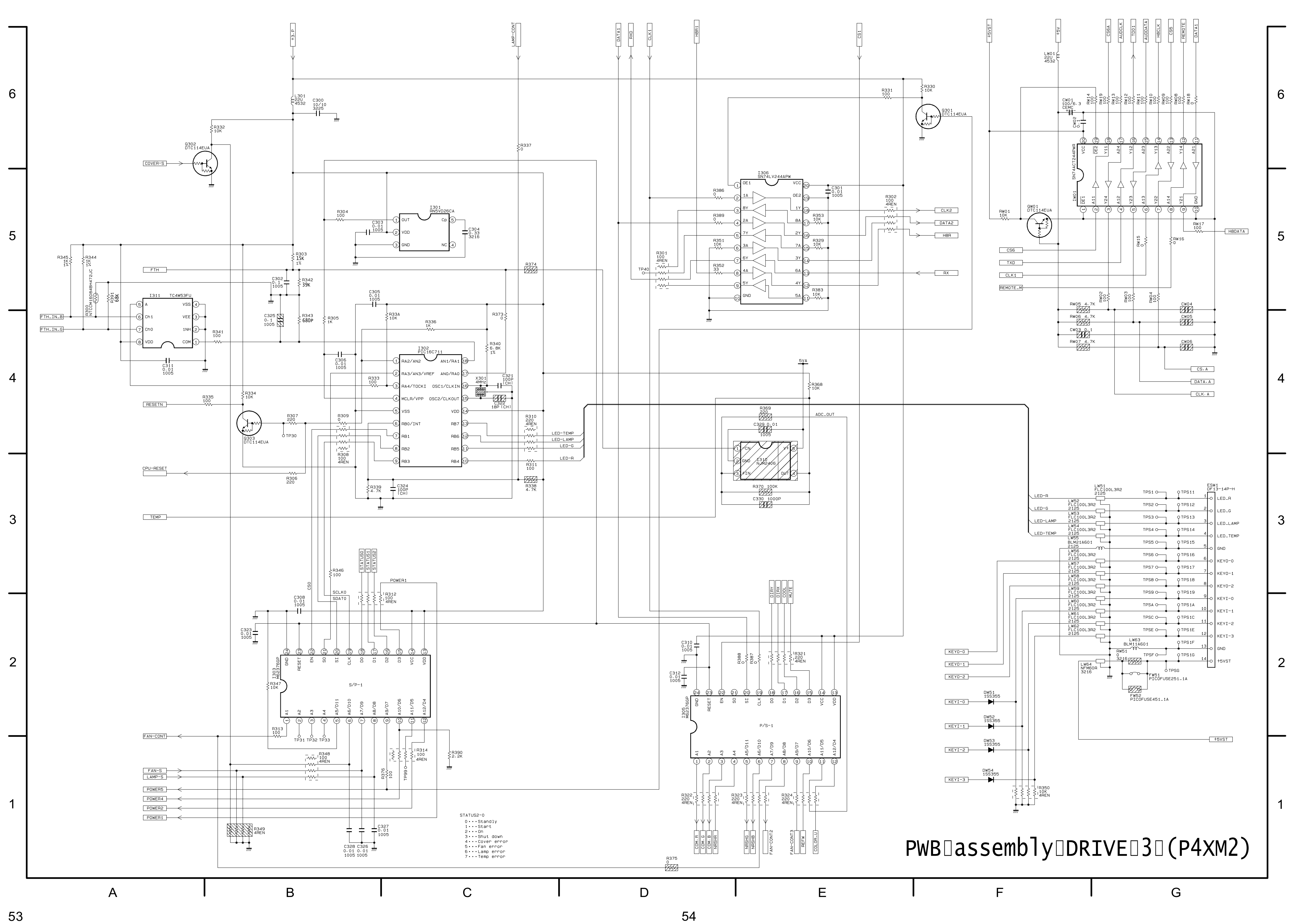
PWB assembly FAN 2 (P4XM2)


PWB assembly FAN 3
(P4XM2)
A
B
C
D
E
F
G
1
2
3
4
5
6

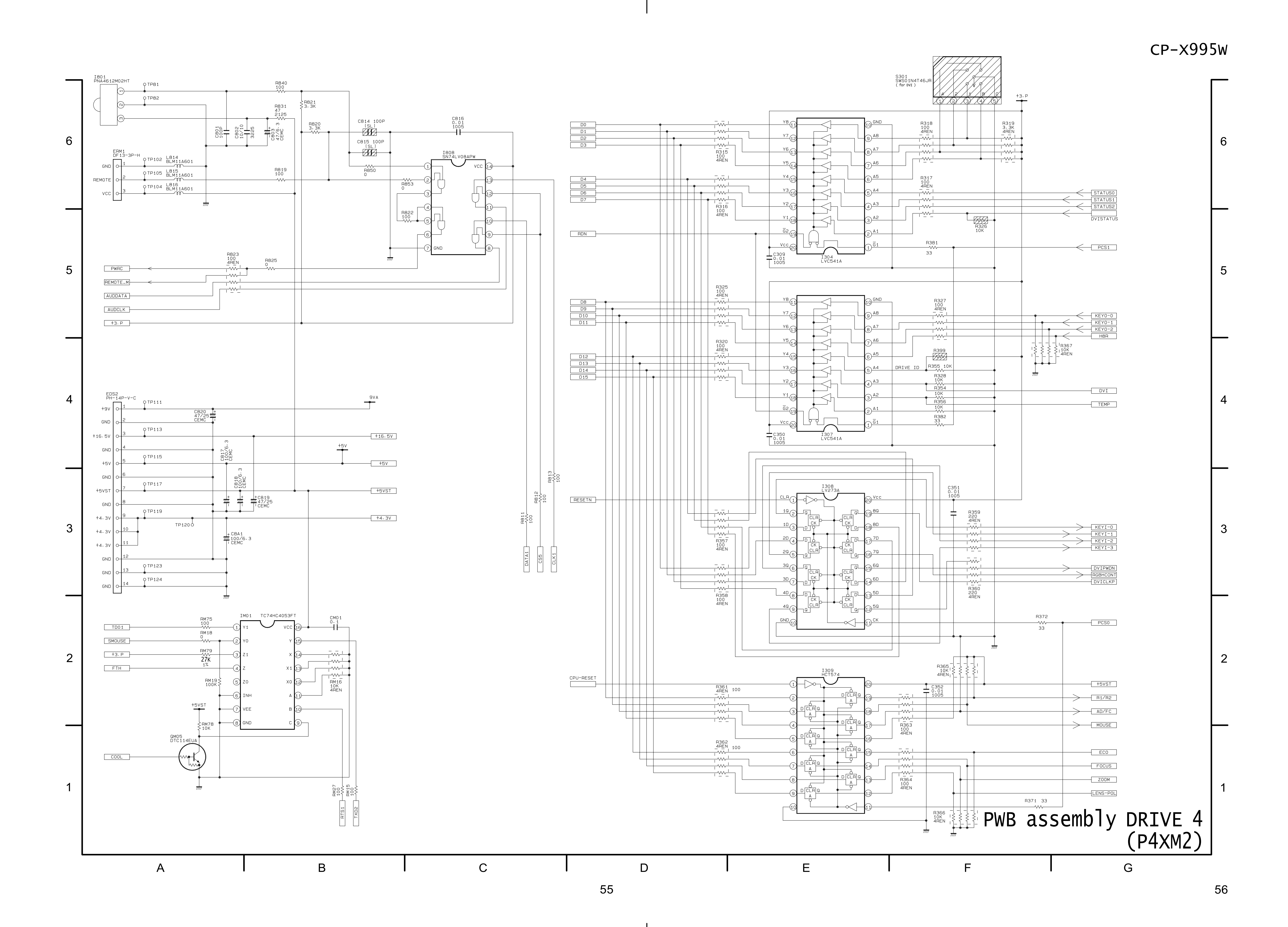

PWB assembly DRIVE 1
(P4XM2)
BOTTOM VIEW

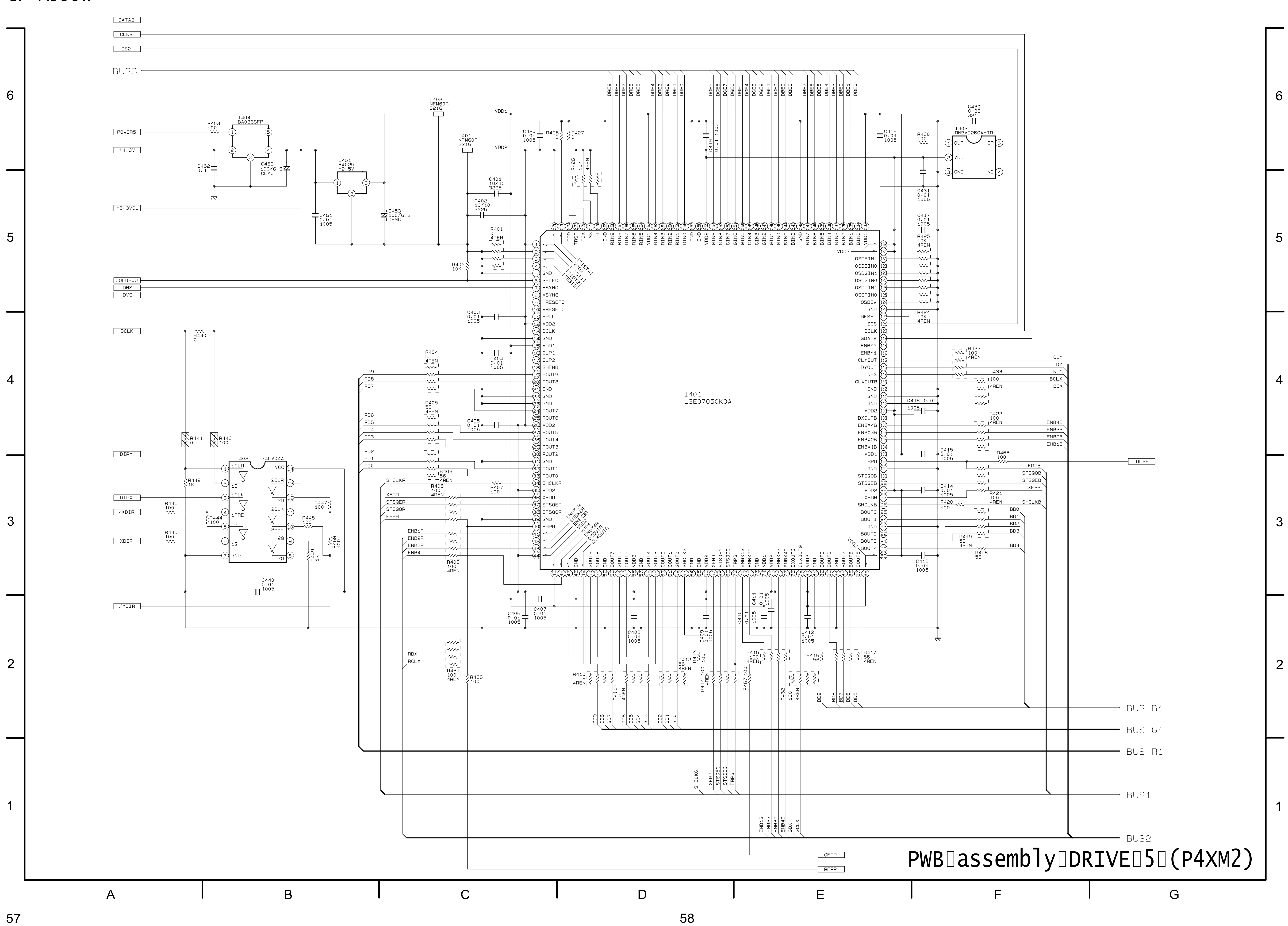


PWB assembly DRIVE 2 (P4XM2)

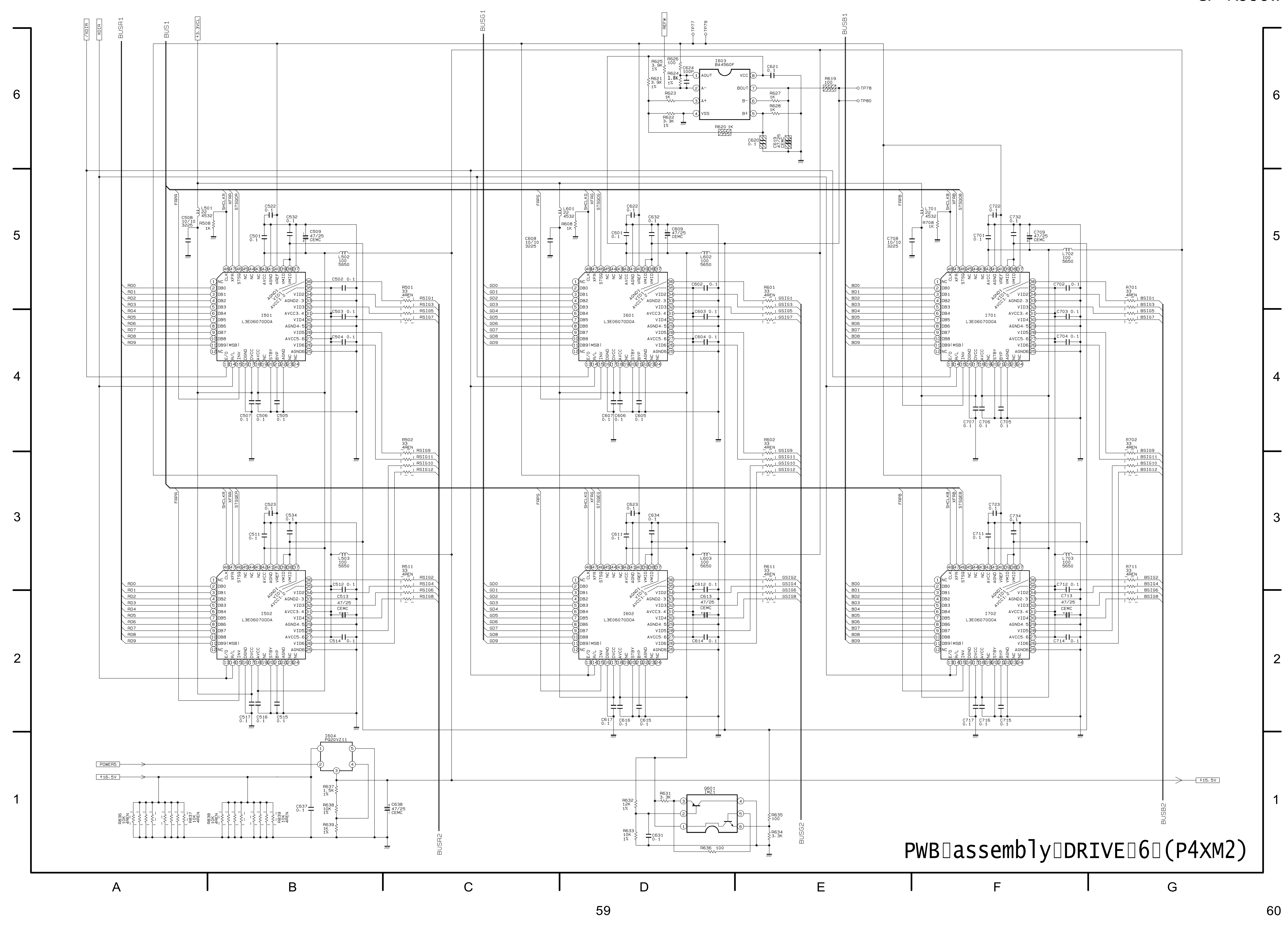


PWB assembly DRIVE 3 (P4XM2)

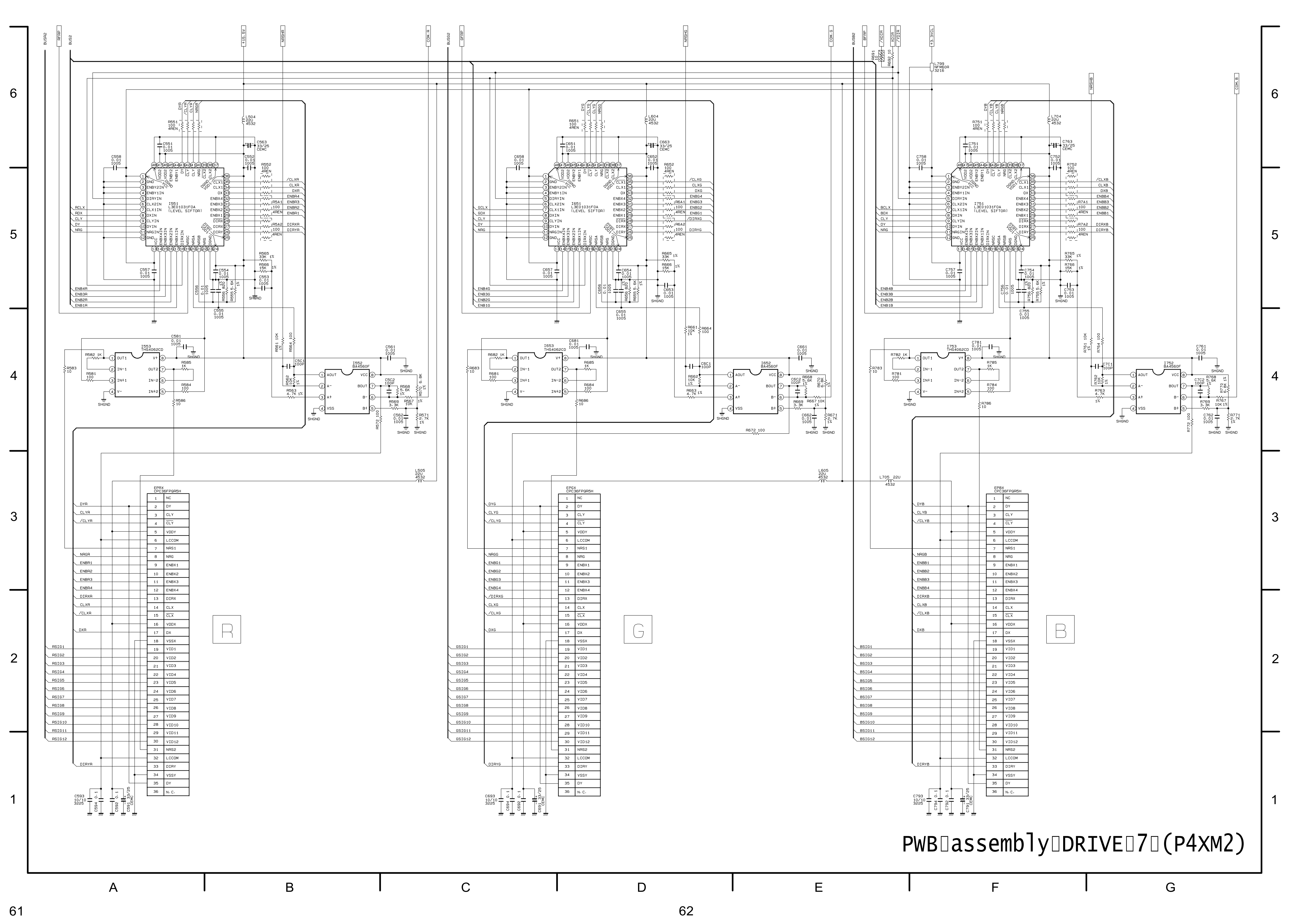

PWB assembly DRIVE 4
(P4XM2)
I801 PNA4612M02HT
ERM1 DF13-3P-H
I808 SN74LV08APW
EDS2 PH-14P-V-C
IM01 TC74HC4053FT
QM05 DTC114EUA
I304 LVC541A
I307 LVC541A
I308 LV273A
I309 HCT574
S301 SWS01N4T46JR (for DVI)
PWRC
REMOTE_M
AUDDATA
AUDCLK
+3.P
+16.5V
+5V
+5VST
+4.3V
TD01
SMOUSE
FTH
COOL
RTS1
TXD2
DATA1
CS5
CLK1
RDN
RESETN
CPU-RESET
STATUS0
STATUS1
STATUS2
DVISTATUS
PCS1
KEYO-0
KEYO-1
KEYO-2
HBR
DVI
TEMP
KEYI-0
KEYI-1
KEYI-2
KEYI-3
DVIPWDN
RGBHCONT
DVICLKP
PCS0
R1/R2
AD/FC
MOUSE
ECO
FOCUS
ZOOM
LENS-POL
A
B
C
D
E
F
G



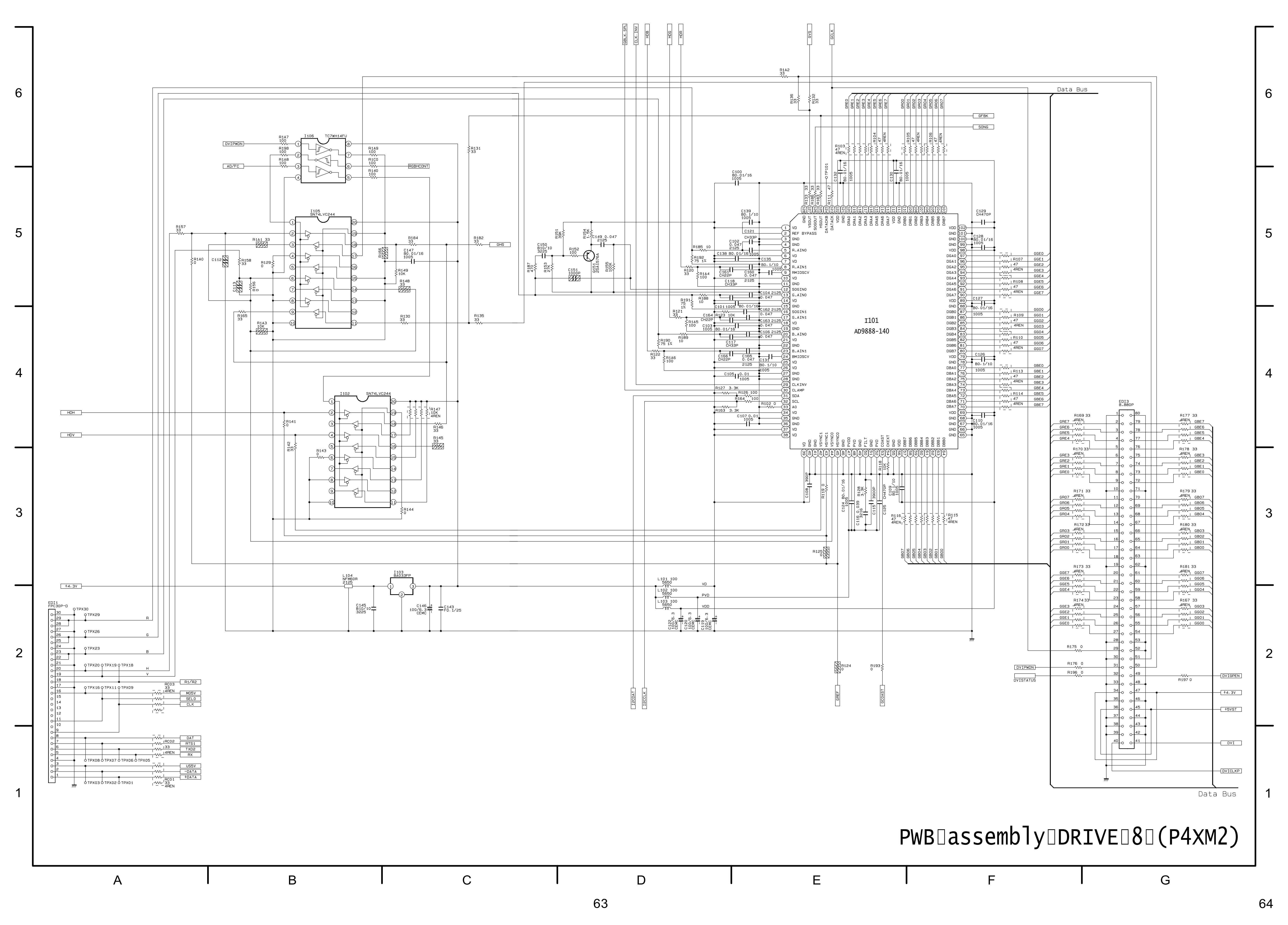
PWB assembly DRIVE 5 (P4XM2)



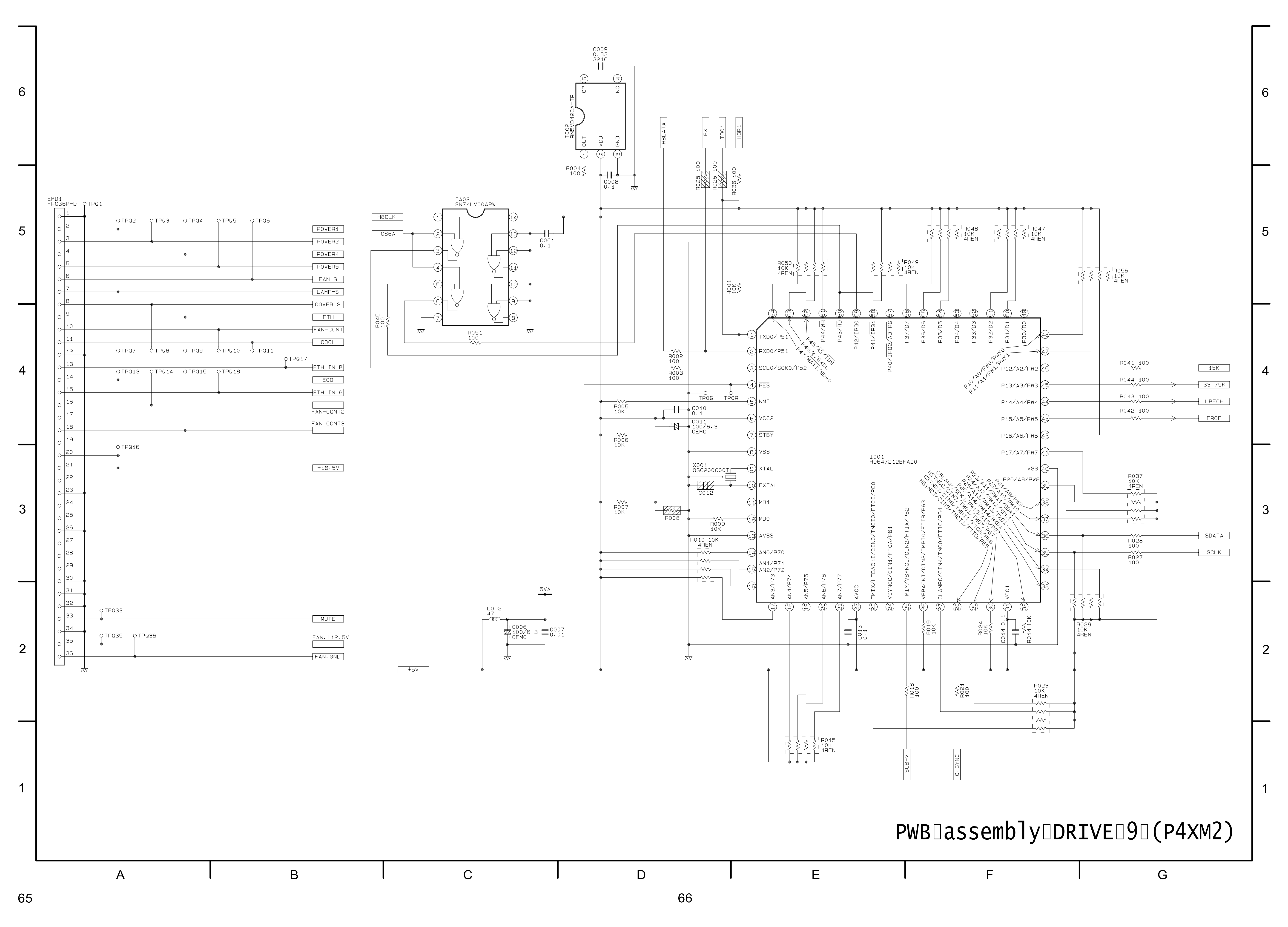
PWB assembly DRIVE 6 (P4XM2)



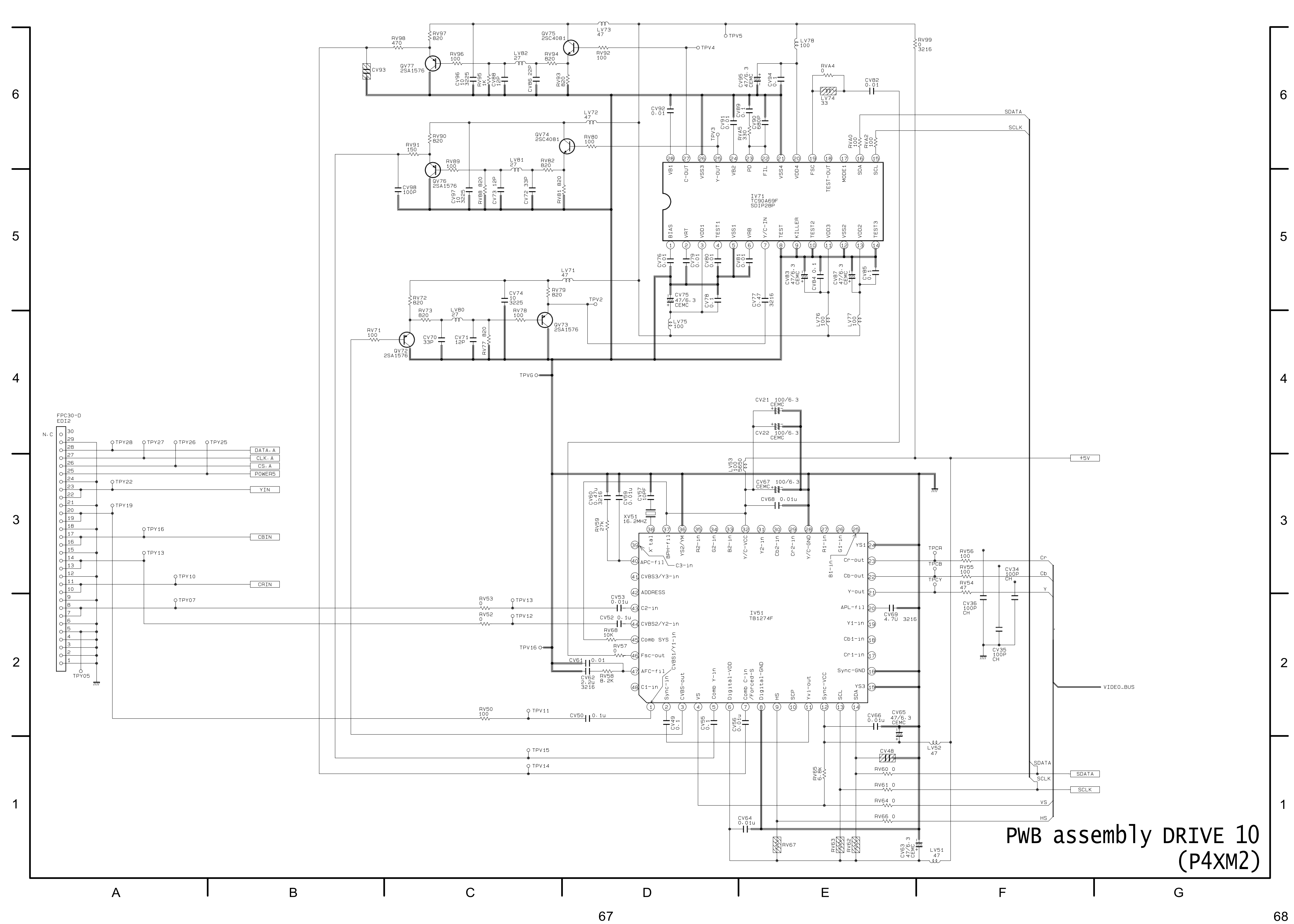
PWB assembly DRIVE 7 (P4XM2)



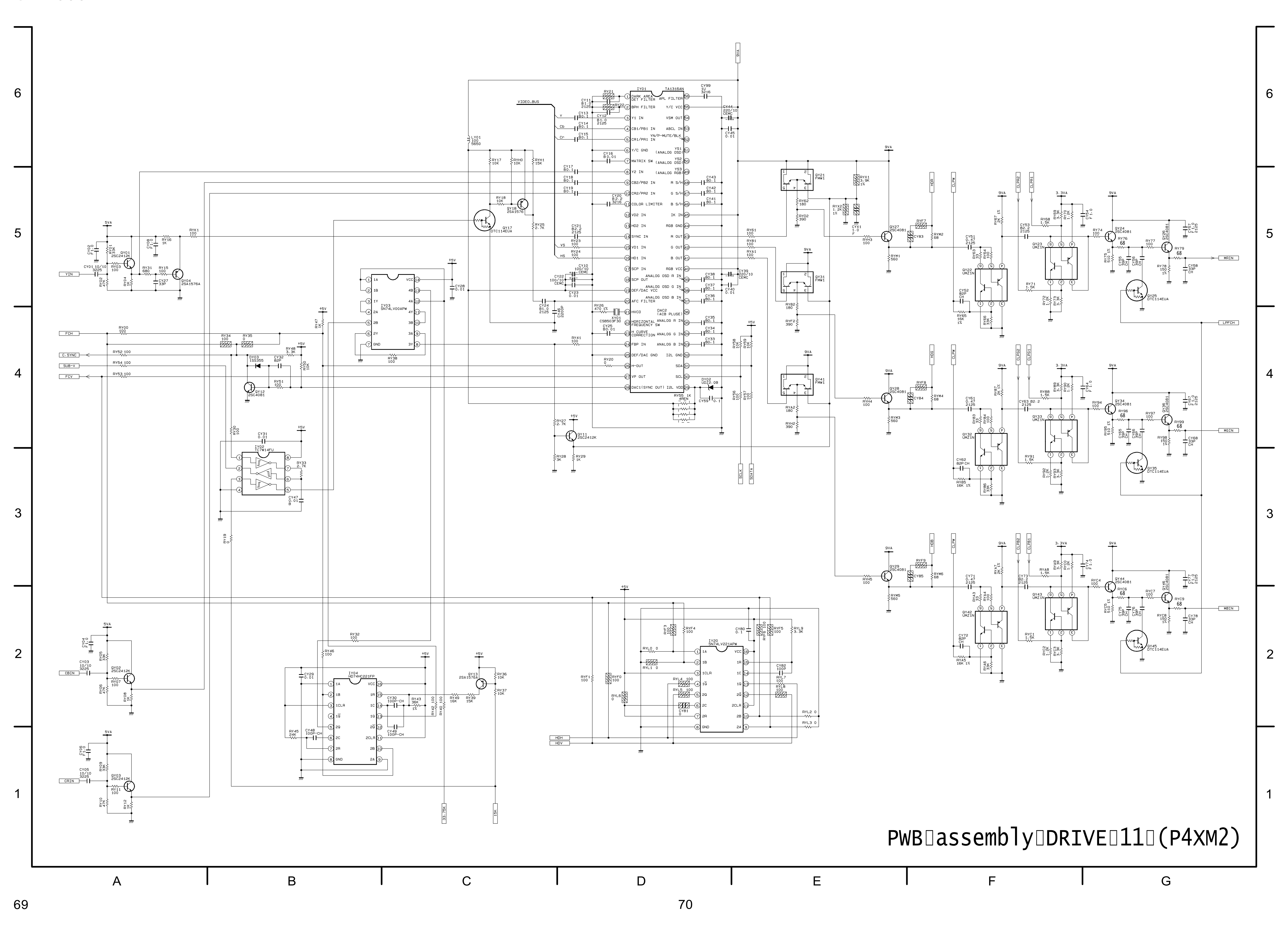
PWB assembly DRIVE 8 (P4XM2)



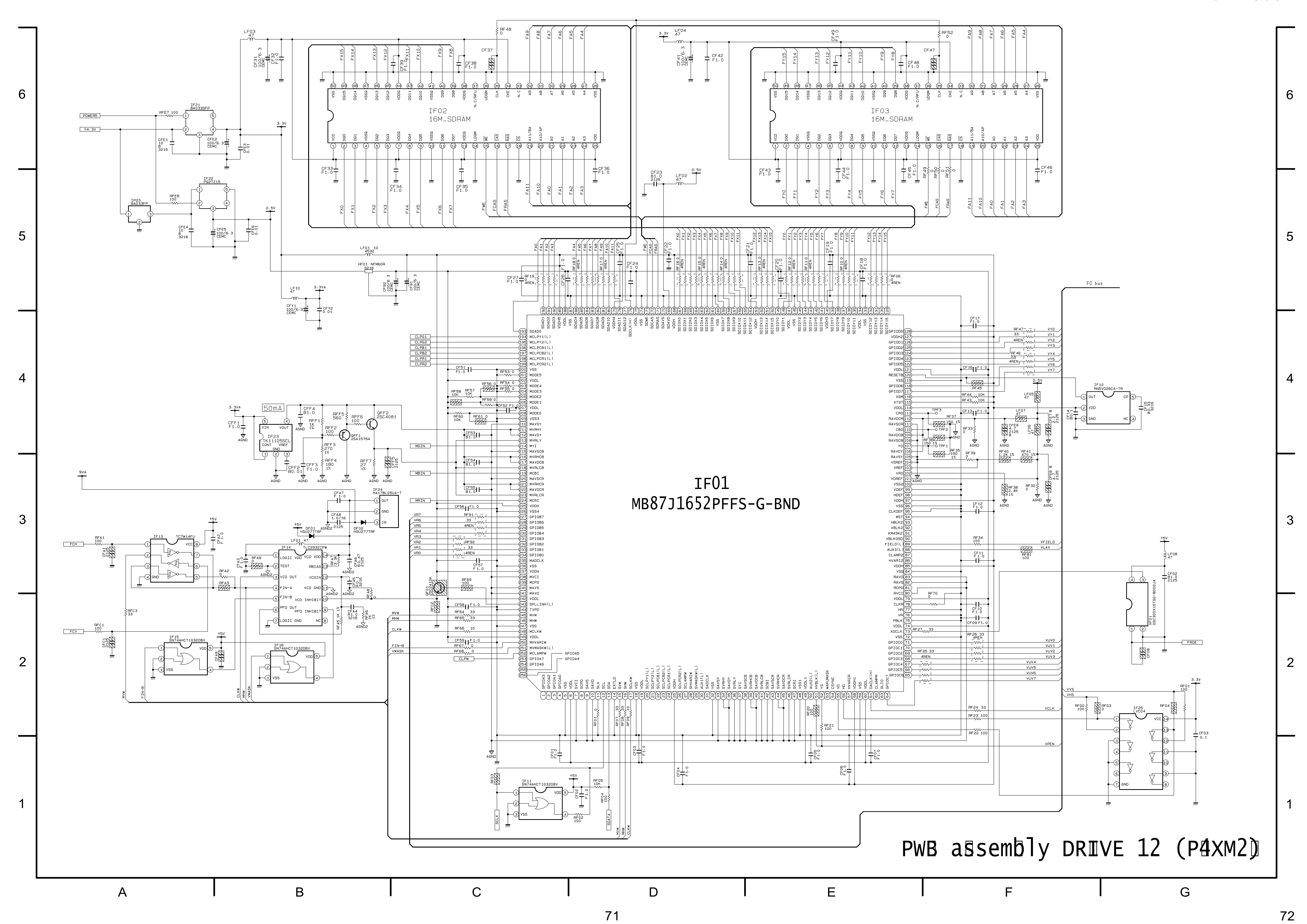
PWB assembly DRIVE 9 (P4XM2)

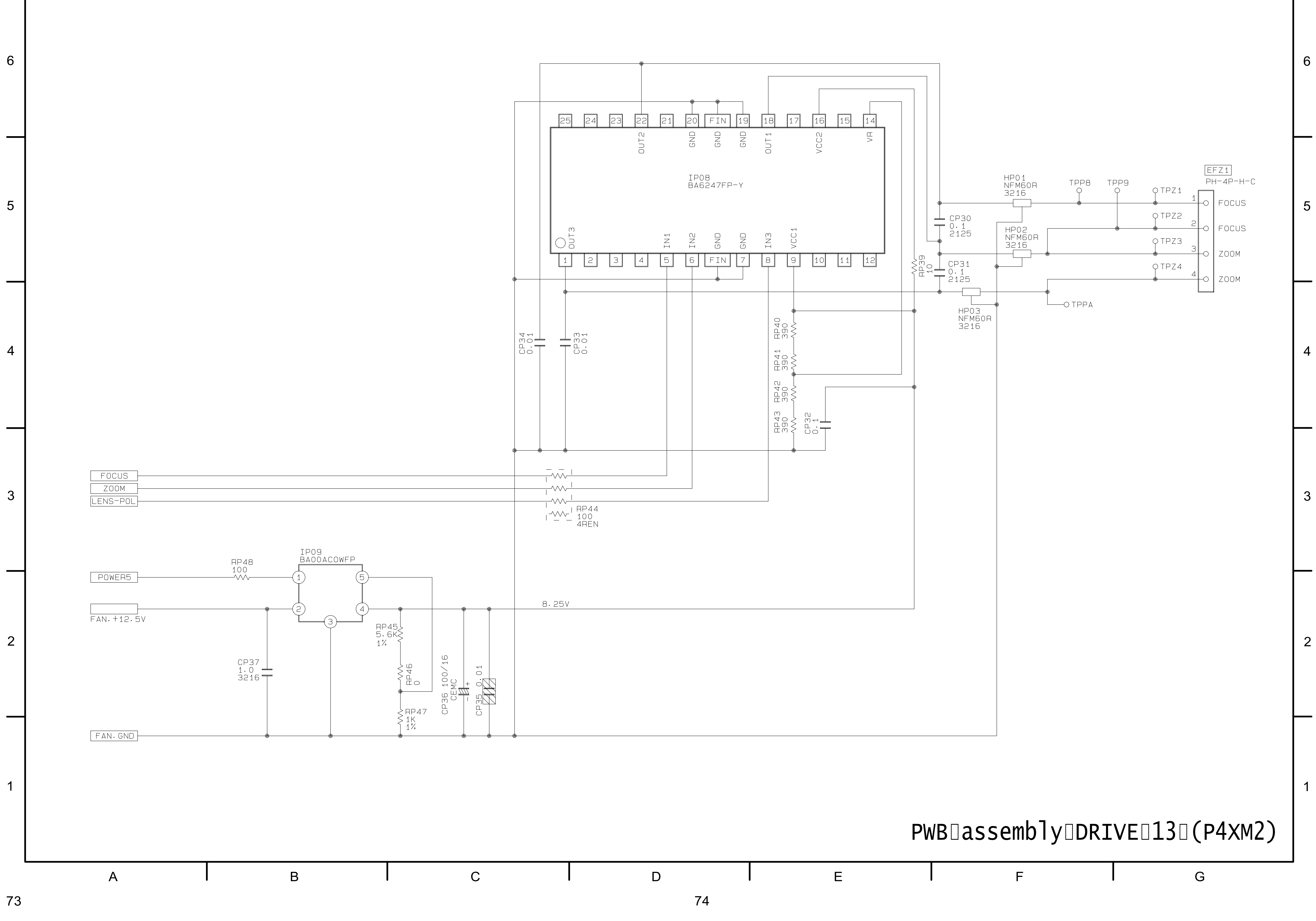


PWB assembly DRIVE 10
(P4XM2)

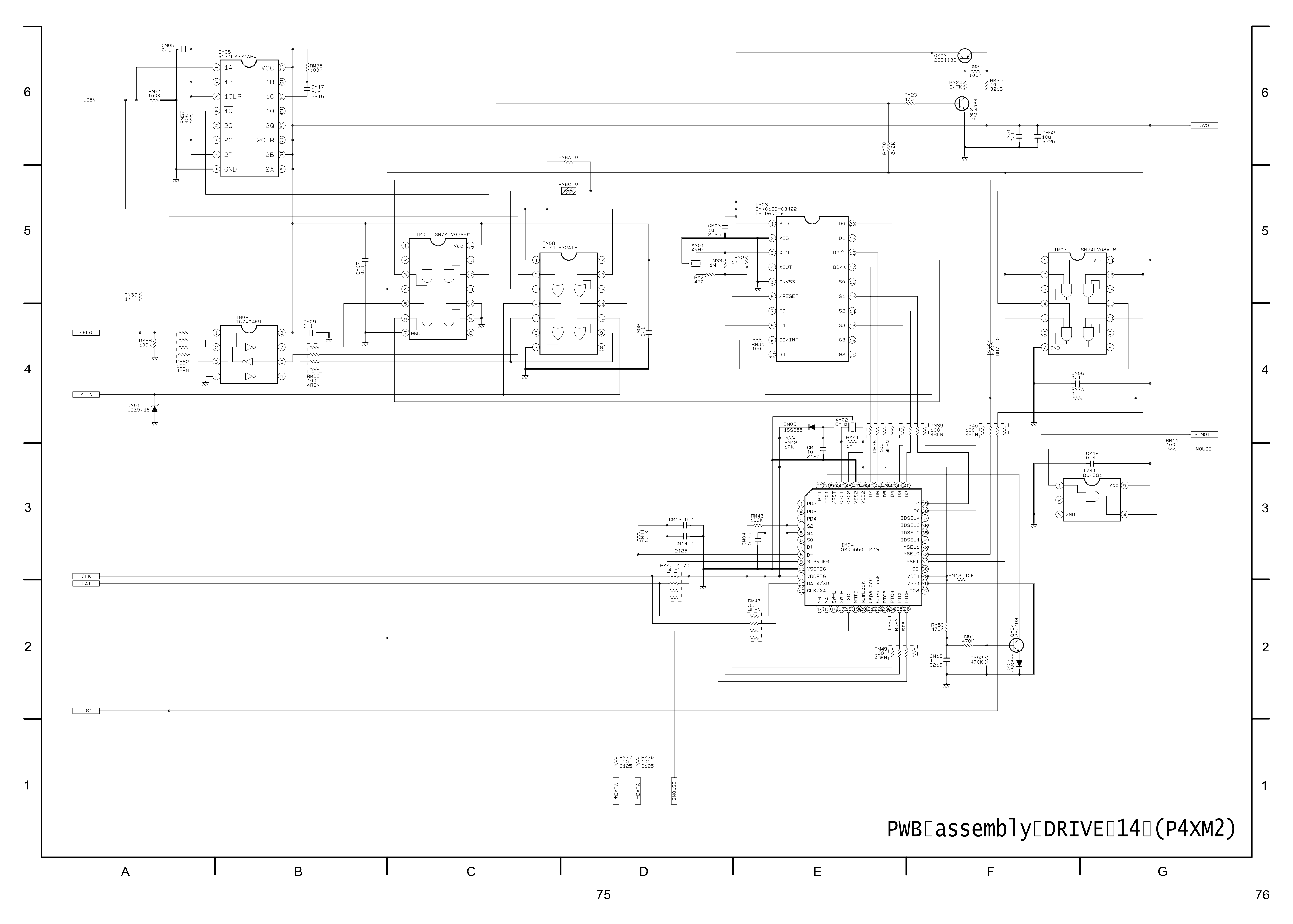


PWB assembly DRIVE 11 (P4XM2)


IF01
MB87J1652PFFS-G-BND
IF02
16M_SDRAM
IF03
16M_SDRAM
PWB assembly DRIVE 12 (P4XM2)

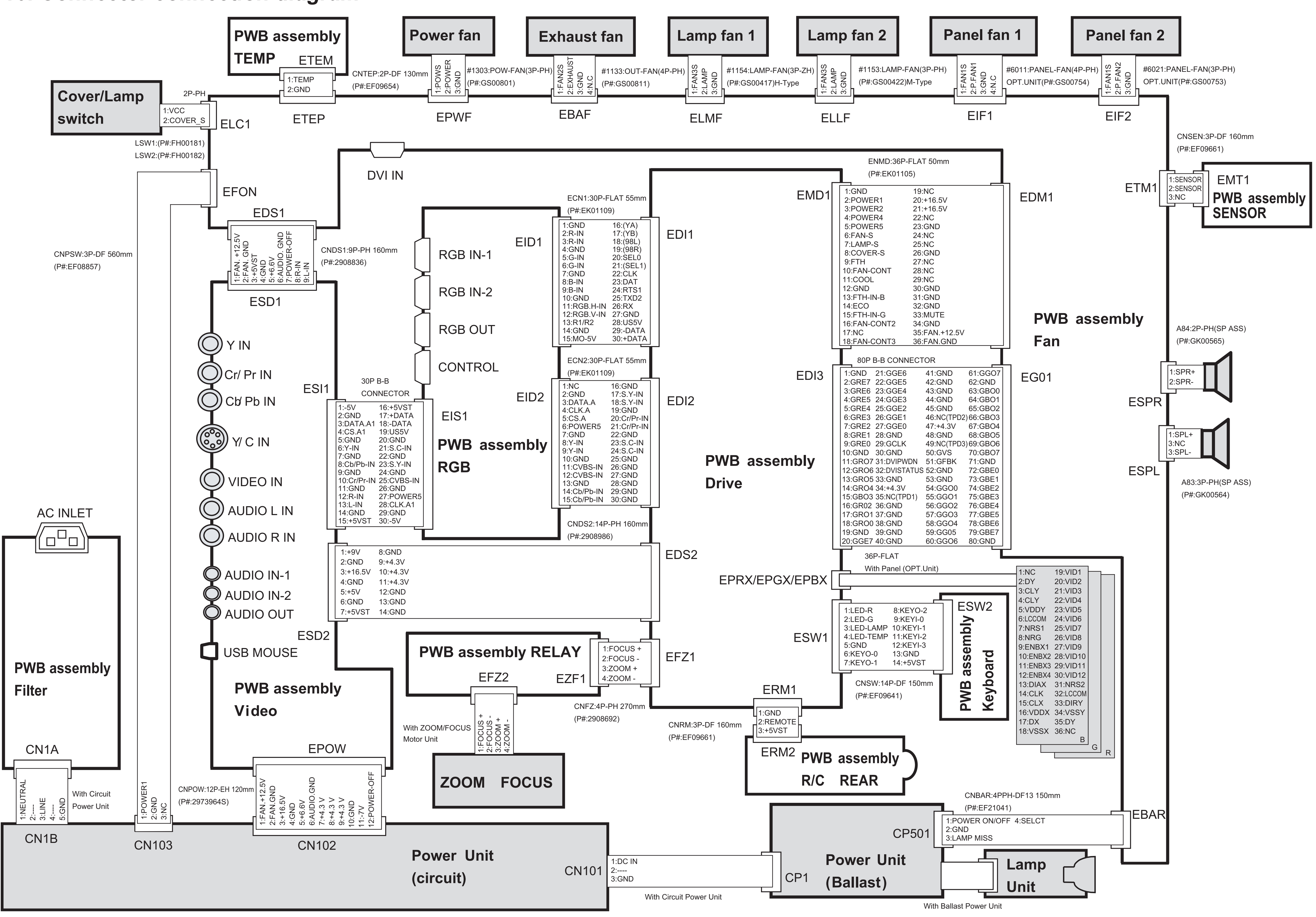


PWB assembly DRIVE 13 (P4XM2)

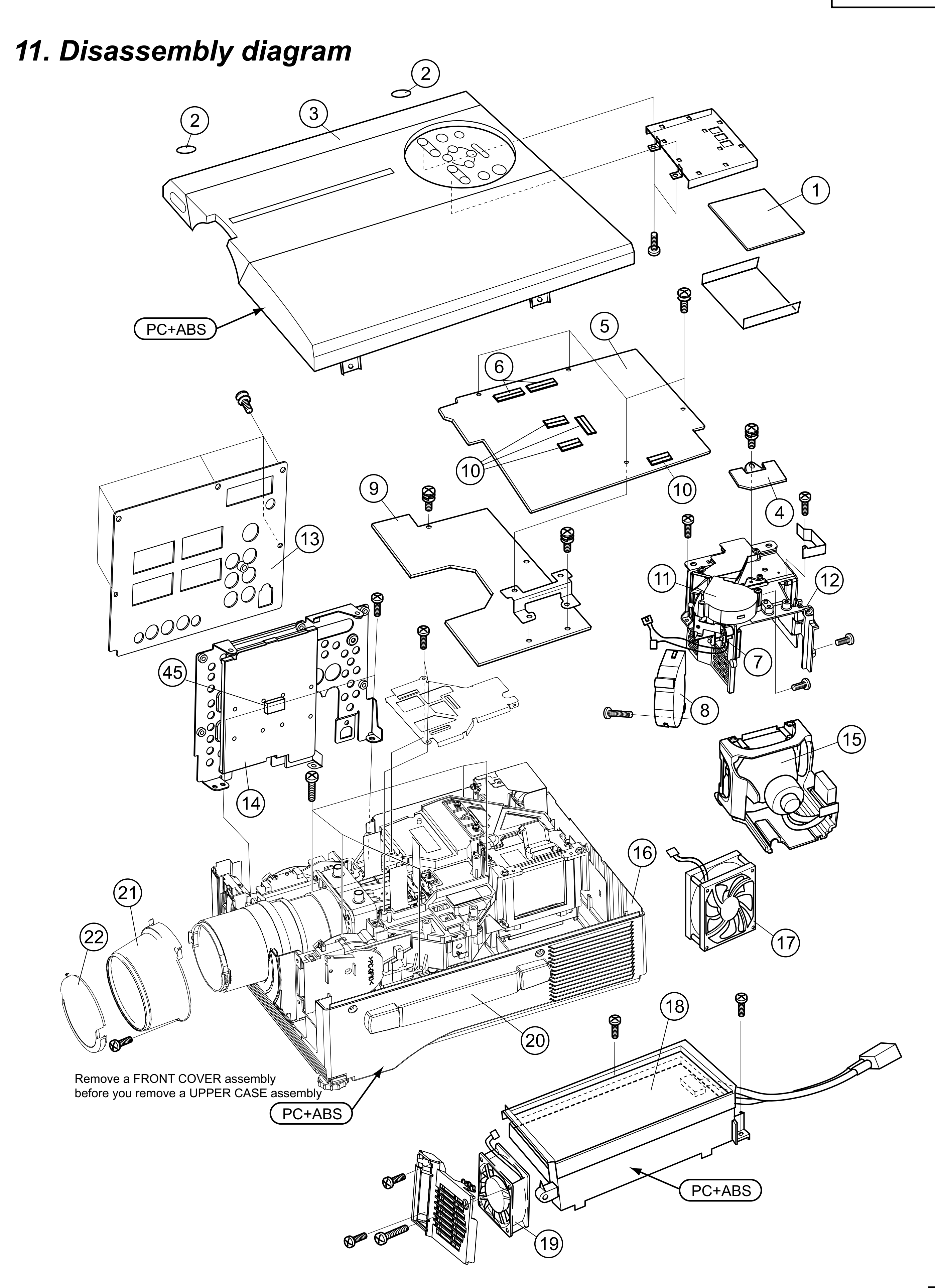


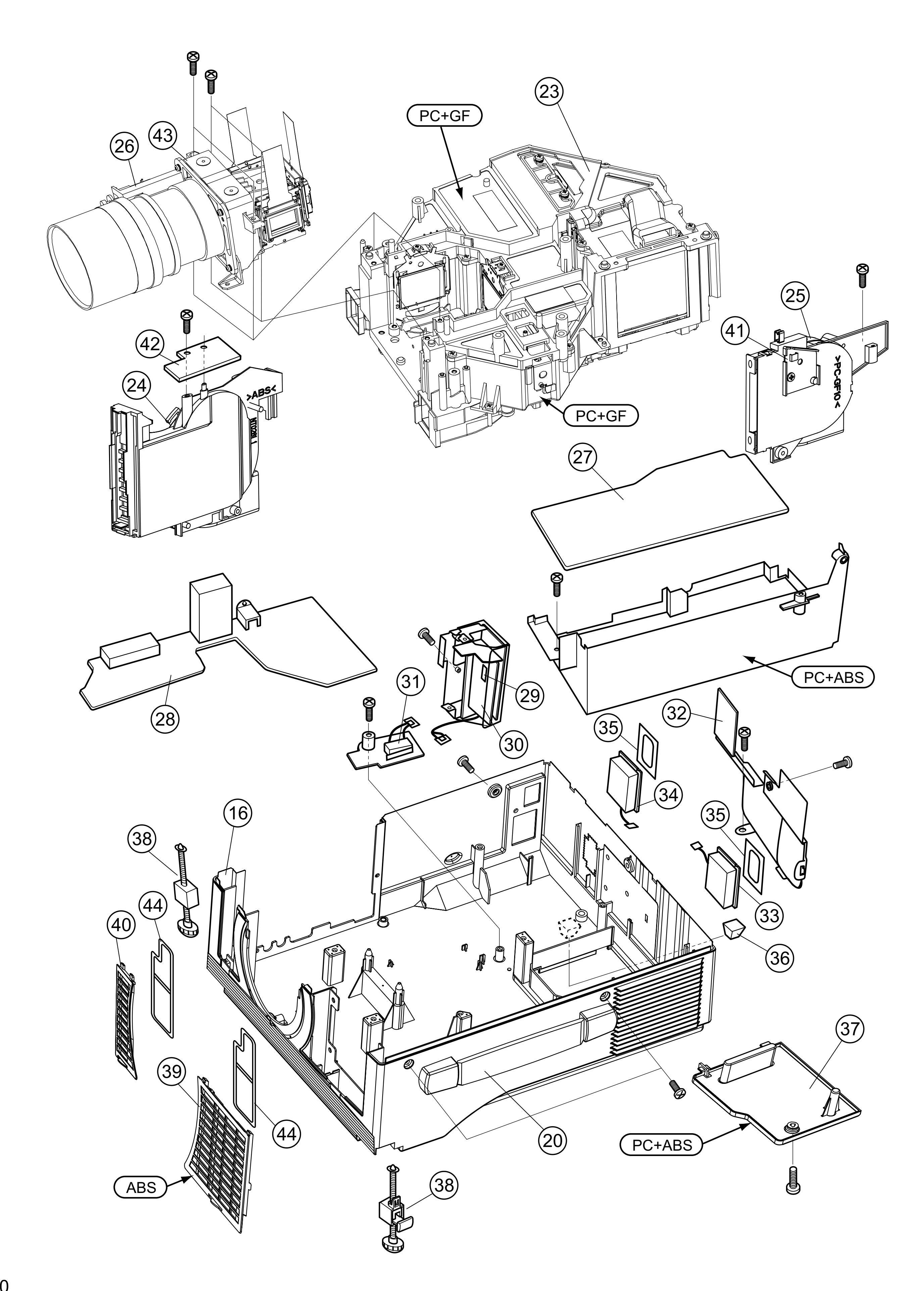
PWB assembly DRIVE 14 (P4XM2)

10. Connector connection diagram



11. Disassembly diagram




23
PC+GF
26
43
25
41
>PC-GF10<
42
24
>ABS<
PC+GF
27
PC+ABS
28
31
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30
32
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16
38
33
44
40
36
37
39
44
20
PC+ABS
ABS
38

12. Replacement Parts list

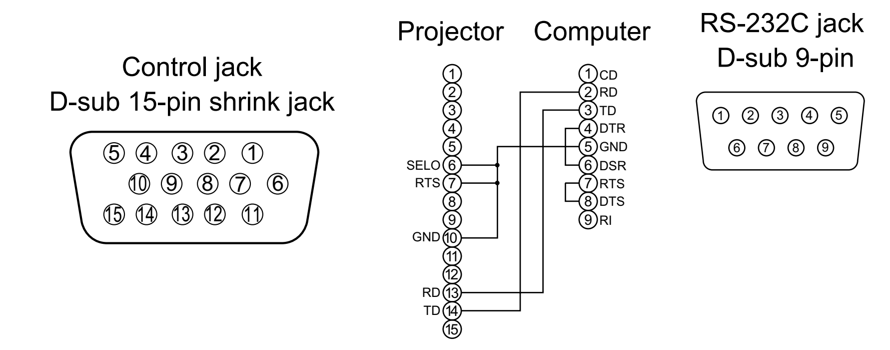
PRODUCT SAFETY NOTE : Components marked with a ⚠ have special characteristics important to safety. Before replacing any of there components, read carefully, the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the projector through improper servicing.

NOTE : As for the maintenance of failure portion, please don't exchange any parts except mentioned in the parts list below.

SYMBOL NO.	PARTS NO.	DESCRIPTION	SYMBOL NO.	PARTS NO.	DESCRIPTION
1	JP05495	PWB ASS'Y KEYBOARD	33	GK00564	SPEAKER (L)
2	MU00841	FOOT P3	34	GK00565	SPEAKER (R)
3	QD21664	UPPER CASE ASS'Y	35	MU01021	SP SHEET P3
4	JP05496	PWB ASS'Y TEMPERATURE	36	PE00111	RUBBER FOOT
5	JP05482	PWB ASS'Y DRIVE	37	QD34511	LAMP DOOR ASS'Y
6	EA01031R	CPC30 CONNECTOR	38	QJ00621	ADJUST FOOT
7	FH00181	LIMIT SWITCH(LAMP)	39	QD34174	FILTER COVER L ASS'Y
⚠ 8	GS00417	DC FAN(LAMP V)	40	QD34154	FILTER COVER R ASS'Y
9	JP05483	PWB ASS'Y FAN	41	JP05485	PWB ASS'Y SENSOR
10	EA01033R	CPC36 CONNECTOR	42	JP05497	PWB ASS'Y RELAY
⚠ 11	GS00422	DC FAN(LAMP H)	43	UX08175	LCD/LENS PRISM ASS'Y
12	NJ05403	LAMP SWITCH HOUSE	44	MN04531	AIR FILTER SERVICE
13	PM23171	P4 DECO PANEL	45	CK31602R	EL4332CS
14	JP05494	PWB ASS'Y RGB			
⚠ 15	DT00491	P4 LAMP UNIT ASS'Y			
16	QD34131	BOTTOM CASE ASS'Y			
⚠ 17	GS00811	DC FAN(EXHAUST)			
⚠ 18	HA01071	POWER UNIT(BALLAST)	⚠	EV00631	POWER SUPPLY CORD(US TYPE 125V)
⚠ 19	GS00801	DC FAN(POWER)	⚠	EV00641	POWER SUPPLY CORD(EUROPE TYPE)
20	PV00241	HANDLE	⚠	EV00341	POWER SUPPLY CORD(U.K. TYPE)
21	QD21671	FRONT BEZEL ASS'Y		EW06661	RGB-D CABLE(15PIN MALE TO 15PIN MALE)
22	QD08012	LENS CAP		EW06651	COMPONENT CABLE
23	UE20095	DICHROIC OPTICS UNIT		HL01811	REMOTE CONTROL UNIT W/POINTER
⚠ 24	GS00753	DC FAN(INTAKE R,G)		EW02753	PS/2-2 MOUSE CABLE W/CORE
⚠ 25	GS00754	DC FAN(INTAKE B)		NX05741	CLEANING TOOL FOR DUST
26	GP00251	DC MOTOR ASS'Y		NX05742	COTTON STICK L70
⚠ 27	HA01081	POWER UNIT(CIRCUIT)		QR53721	INSTRUCTION MANUAL S-ASS'Y
28	JP05493	PWB ASS'Y VIDEO			
⚠ 29	2722449	FUSE 8.0A			
30	HA01091	FILTER ASS'Y			
31	FH00182	LIMIT SWITCH(LAMP DOOR)			
32	JP05484	PWB ASS'Y REMOTE CONTROL			

13. RS-232C communication

(1) Turn off the projector and computer power supplies and connect with the RS-232C cable.
(2) Turn on the computer power supply and, after the computer has started up, turn on the projector power supply.



Communications setting

19200bps, 8N1

1 Protocol

Consist of header (7 bytes) + command data (6 bytes).

2 Header

BE + EF + 03 + 06 + 00 + CRC_low + CRC_high
CRC_low : Lower byte of CRC flag for command data.
CRC_high : Upper byte of CRC flag for command data.

3 Command data

Command data chart

byte_0	byte_1	byte_2	byte_3	byte_4	byte_5
Action		Type		Setting code	
low	high	low	high	low	high

Action (byte_0 - 1)

Action	Classification	Content
1	SET	Change setting to desired value.
2	GET	Read projector internal setup value.
4	INCREMENT	Increment setup value by 1.
5	DECREMENT	Decrement setup value by 1.
6	EXECUTE	Run a command.

Requesting projector status (Get command)

(1) Send the request code Header + Command data (‘02H’+‘00H’+ type (2 bytes) +‘00H’+‘00H’) from the computer to the projector.

(2) The projector returns the response code ‘1DH’+ data (2 bytes) to the computer.

Changing the projector settings (Set command)

(1) Send the setting code Header + Command data (‘01H’+‘00H’+ type (2 bytes) + setting code (2 bytes)) from the computer to the projector.

(2) The projector changes the setting based on the above setting code.

(3) The projector returns the response code ‘06H’ to the computer.

Using the projector default settings (Reset Command)

(1) The computer sends the default setting code Header + Command data (‘06H’+‘00H’+ type (2 bytes) +‘00H’+‘00H’) to the projector.

(2) The projector changes the specified setting to the default value.

(3) The projector returns the response code ‘06H’ to the computer.

Increasing the projector setting value (Increment command)

(1) The computer sends the increment code Header + Command data (‘04H’+‘00H’+ type (2 bytes) +‘00H’+‘00H’) to the projector.

(2) The projector increases the setting value on the above setting code.

(3) The projector returns the response code ‘06H’ to the computer.

Decreasing the projector setting value (Decrement command)

(1) The computer sends the decrement code Header + Command data (‘05H’+‘00H’+ type (2 bytes) +‘00H’+‘00H’) to the projector.

(2) The projector decreases the setting value on the above setting code.

(3) The projector returns the response code ‘06H’ to the computer.

When a command sent by the projector cannot be understood by the computer

When the command sent by the projector cannot be understood, the error command ‘15H’ is returned by the computer. Some times, the projector ignores RS-232C commands during other works. If the error command ‘15H’ is returned, please send the same command again.

When data sent by the projector cannot be practice

When the command sent by the projector cannot be practice, the error code ‘1cH’ +‘xxxxH’ is returned.
When the data length is greater than indicated by the data length code, the projector will ignore the excess data code. Conversely, when the data length is shorter than indicated by the data length code, an error code will be returned to the projector.

NOTE: • Operation cannot be guaranteed when the projector receives an undefined command or data.

• Provide an interval of at least 40ms between the response code and any other code.

• The projector outputs test data when the power supply is switched ON, and when the lamp is lit.

• Commands are not accepted during warm-up.

Command data chart

Names	Operation type		Header			CRC	Action	Type	Setting code
Blank Color	Set	Red	BE EF	03	06 00	3B D3	01 00	00 30	00 00
		Orange	BE EF	03	06 00	AB D2	01 00	00 30	01 00
		Green	BE EF	03	06 00	5B D2	01 00	00 30	02 00
		Blue	BE EF	03	06 00	CB D3	01 00	00 30	03 00
		Purple	BE EF	03	06 00	FB D1	01 00	00 30	04 00
		White	BE EF	03	06 00	6B D0	01 00	00 30	05 00
		Black	BE EF	03	06 00	9B D0	01 00	00 30	06 00
		MyScreen	BE EF	03	06 00	FB CA	01 00	00 30	20 00
		ORIGINAL	BE EF	03	06 00	FB E2	01 00	00 30	40 00
	Get		BE EF	03	06 00	08 D3	02 00	00 30	00 00
Mirror	Set	Normal	BE EF	03	06 00	C7 D2	01 00	01 30	00 00
		H Inverse	BE EF	03	06 00	57 D3	01 00	01 30	01 00
		V Inverse	BE EF	03	06 00	A7 D3	01 00	01 30	02 00
		H&V Inverse	BE EF	03	06 00	37 D2	01 00	01 30	03 00
	Get		BE EF	03	06 00	F4 D2	02 00	01 30	00 00
Freeze	Set	Normal	BE EF	03	06 00	83 D2	01 00	02 30	00 00
		Freeze	BE EF	03	06 00	13 D3	01 00	02 30	01 00
	Get		BE EF	03	06 00	B0 D2	02 00	02 30	00 00
Menu Color	Set	Red	BE EF	03	06 00	7F D3	01 00	03 30	00 00
		Orange	BE EF	03	06 00	EF D2	01 00	03 30	01 00
		Green	BE EF	03	06 00	1F D2	01 00	03 30	02 00
		Blub	BE EF	03	06 00	8F D3	01 00	03 30	03 00
		Purple	BE EF	03	06 00	BF D1	01 00	03 30	04 00
		Transparent	BE EF	03	06 00	2F D0	01 00	03 30	05 00
		Gray	BE EF	03	06 00	DF D0	01 00	03 30	06 00
	Get		BE EF	03	06 00	4C D3	02 00	03 30	00 00
Startup	Set	ORIGINAL	BE EF	03	06 00	0B D2	01 00	04 30	00 00
		OFF	BE EF	03	06 00	9B D3	01 00	04 30	01 00
		MyScreen	BE EF	03	06 00	CB CB	01 00	04 30	20 00
	Get		BE EF	03	06 00	38 D2	02 00	04 30	00 00
Language	Set	English	BE EF	03	06 00	F7 D3	01 00	05 30	00 00
		Français	BE EF	03	06 00	67 D2	01 00	05 30	01 00
		Deutsch	BE EF	03	06 00	97 D2	01 00	05 30	02 00
		Español	BE EF	03	06 00	07 D3	01 00	05 30	03 00
		Italiano	BE EF	03	06 00	37 D1	01 00	05 30	04 00
		Norsk	BE EF	03	06 00	A7 D0	01 00	05 30	05 00
		Nederlands	BE EF	03	06 00	57 D0	01 00	05 30	06 00
		Português	BE EF	03	06 00	C7 D1	01 00	05 30	07 00
		Japanese	BE EF	03	06 00	37 D4	01 00	05 30	08 00
	Get		BE EF	03	06 00	C4 D3	02 00	05 30	00 00

Command data chart

Names	Operation type		Header	CRC	Action	Type	Setting code
					Command data		
Magnify	Get		BE EF 03 06 00	7C D2	02 00	07 30	00 00
	Increment		BE EF 03 06 00	1A D2	04 00	07 30	00 00
	Decrement		BE EF 03 06 00	CB D3	05 00	07 30	00 00
Auto off	Get		BE EF 03 06 00	08 86	02 00	10 31	00 00
	Increment		BE EF 03 06 00	6E 86	04 00	10 31	00 00
	Decrement		BE EF 03 06 00	BF 87	05 00	10 31	00 00
Brightness Reset	Execute		BE EF 03 06 00	58 D3	06 00	00 70	00 00
Contrast Reset	Execute		BE EF 03 06 00	A4 D2	06 00	01 70	00 00
V.Position Reset	Execute		BE EF 03 06 00	E0 D2	06 00	02 70	00 00
H.Position Reset	Execute		BE EF 03 06 00	IC D3	06 00	03 70	00 00
H.Size Reset	Execute		BE EF 03 06 00	68 D2	06 00	04 70	00 00
Color Balance R Reset	Execute		BE EF 03 06 00	94 D3	06 00	05 70	00 00
Color Balance B Reset	Execute		BE EF 03 06 00	D0 D3	06 00	06 70	00 00
Sharpness Reset	Execute		BE EF 03 06 00	C4 D0	06 00	09 70	00 00
Color Reset	Execute		BE EF 03 06 00	80 D0	06 00	0A 70	00 00
Tint Reset	Execute		BE EF 03 06 00	7C D1	06 00	0B 70	00 00
Keystone_V Reset	Execute		BE EF 03 06 00	08 D0	06 00	0C 70	00 00
Keystone_H Reset	Execute		BE EF 03 06 00	98 D8	06 00	20 70	00 00
Auto	Execute		BE EF 03 06 00	91 D0	06 00	0A 20	00 00
Blank on/off	Set	off	BE EF 03 06 00	FB D8	01 00	20 30	00 00
		on	BE EF 03 06 00	6B D9	01 00	20 30	01 00
	Get		BE EF 03 06 00	C8 D8	02 00	20 30	00 00
Error Status	Get		BE EF 03 06 00	D9 D8	02 00	20 60	00 00
			(Example of Return) 00 00 (Normal) 01 00 (Cover-error) 02 00 (Fan-error) 03 00 (Lamp-error) 04 00 (Temp-error) 05 00 (Air flow-error) 06 00 (Lamp-Time-over)				
Power	Set	OFF	BE EF 03 06 00	2A D3	01 00	00 60	00 00
		ON	BE EF 03 06 00	BA D2	01 00	00 60	01 00
	Get		BE EF 03 06 00	19 D3	02 00	00 60	00 00
Input Source	Set	RGB1	BE EF 03 06 00	FE D2	01 00	00 20	00 00
		RGB2	BE EF 03 06 00	3E D0	01 00	00 20	04 00
		Digital	BE EF 03 06 00	0E D2	01 00	00 20	03 00
		Video	BE EF 03 06 00	6E D3	01 00	00 20	01 00
		SVideo	BE EF 03 06 00	9E D3	01 00	00 20	02 00
		Component	BE EF 03 06 00	AE D1	01 00	00 20	05 00
	Get		BE EF 03 06 00	CD D2	02 00	00 20	02 00
Volume	Get		BE EF 03 06 00	31 D3	02 00	01 20	00 00
	Increment		BE EF 03 06 00	57 D3	04 00	01 20	00 00
	Decrement		BE EF 03 06 00	86 D2	05 00	01 20	00 00

Command data chart

Names	Operation type		Header	CRC	Command data: Action	Type	Setting code
Mute	Set	Normal	BE EF 03 06 00	46 D3	01 00	02 20	00 00
		Mute	BE EF 03 06 00	D6 D2	01 00	02 20	01 00
	Get		BE EF 03 06 00	75 D3	02 00	02 20	00 00
Brightness	Get		BE EF 03 06 00	89 D2	02 00	03 20	00 00
	Increment		BE EF 03 06 00	EF D2	04 00	03 20	00 00
	Decrement		BE EF 03 06 00	3E D3	05 00	03 20	00 00
Contrast	Get		BE EF 03 06 00	FD D3	02 00	04 20	00 00
	Increment		BE EF 03 06 00	9B D3	04 00	04 20	00 00
	Decrement		BE EF 03 06 00	4A D2	05 00	04 20	00 00
Color Balance R	Get		BE EF 03 06 00	01 D2	02 00	05 20	00 00
	Increment		BE EF 03 06 00	67 D2	04 00	05 20	00 00
	Decrement		BE EF 03 06 00	B6 D3	05 00	05 20	00 00
Color Balance B	Get		BE EF 03 06 00	45 D2	02 00	06 20	00 00
	Increment		BE EF 03 06 00	23 D2	04 00	06 20	00 00
	Decrement		BE EF 03 06 00	F2 D3	05 00	06 20	00 00
Keystone_V	Get		BE EF 03 06 00	B9 D3	02 00	07 20	00 00
	Increment		BE EF 03 06 00	DF D3	04 00	07 20	00 00
	Decrement		BE EF 03 06 00	0E D2	05 00	07 20	00 00
Keystone_H	Get		BE EF 03 06 00	E9 D0	02 00	0B 20	00 00
	Increment		BE EF 03 06 00	8F D0	04 00	0B 20	00 00
	Decrement		BE EF 03 06 00	5E D1	05 00	0B 20	00 00
Aspect	Set	4:3	BE EF 03 06 00	9E D0	01 00	08 20	00 00
		16:9	BE EF 03 06 00	0E D1	01 00	08 20	01 00
		Small	BE EF 03 06 00	FE D1	01 00	08 20	02 00
	Get		BE EF 03 06 00	AD D0	02 00	08 20	00 00
Display Position at 16 : 9 or Small	Set	Default	BE EF 03 06 00	62 D1	01 00	09 20	00 00
		Bottom	BE EF 03 06 00	F2 D0	01 00	09 20	01 00
		Top	BE EF 03 06 00	02 D0	01 00	09 20	02 00
	Get		BE EF 03 06 00	51 D1	02 00	09 20	00 00
V.Position	Get		BE EF 03 06 00	0D 83	02 00	00 21	00 00
	Increment		BE EF 03 06 00	6B 83	04 00	00 21	00 00
	Decrement		BE EF 03 06 00	BA 82	05 00	00 21	00 00
H.Position	Get		BE EF 03 06 00	F1 82	02 00	01 21	00 00
	Increment		BE EF 03 06 00	97 82	04 00	01 21	00 00
	Decrement		BE EF 03 06 00	46 83	05 00	01 21	00 00
H.Size	Get		BE EF 03 06 00	B5 82	02 00	02 21	00 00
	Increment		BE EF 03 06 00	D3 82	04 00	02 21	00 00
	Decrement		BE EF 03 06 00	02 83	05 00	02 21	00 00
H.Phase	Get		BE EF 03 06 00	49 83	02 00	03 21	00 00
	Increment		BE EF 03 06 00	2F 83	04 00	03 21	00 00
	Decrement		BE EF 03 06 00	FE 82	05 00	03 21	00 00

Command data chart

Names	Operation type		Header	CRC	Action	Type	Setting code
				Command data			
Sharpness	Get		BE EF 03 06 00	F1 72	02 00	01 22	00 00
	Increment		BE EF 03 06 00	97 72	04 00	01 22	00 00
	Decrement		BE EF 03 06 00	46 73	05 00	01 22	00 00
Color	Get		BE EF 03 06 00	B5 72	02 00	02 22	00 00
	Increment		BE EF 03 06 00	D3 72	04 00	02 22	00 00
	Decrement		BE EF 03 06 00	02 73	05 00	02 22	00 00
Tint	Get		BE EF 03 06 00	49 73	02 00	03 22	00 00
	Increment		BE EF 03 06 00	2F 73	04 00	03 22	00 00
	Decrement		BE EF 03 06 00	FE 72	05 00	03 22	00 00
Video Format	Set	Auto	BE EF 03 06 00	9E 75	01 00	00 22	0A 00
		NTSC	BE EF 03 06 00	FE 71	01 00	00 22	04 00
		PAL	BE EF 03 06 00	6E 70	01 00	00 22	05 00
		SECAM	BE EF 03 06 00	6E 75	01 00	00 22	09 00
		NTSC 4.43	BE EF 03 06 00	5E 72	01 00	00 22	02 00
		M-PAL	BE EF 03 06 00	FE 74	01 00	00 22	08 00
		N-PAL	BE EF 03 06 00	0E 71	01 00	00 22	07 00
	Get		BE EF 03 06 00	0D 73	02 00	00 22	00 00
Video NR	Set	off	BE EF 03 06 00	B6 73	01 00	06 22	00 00
		on	BE EF 03 06 00	26 72	01 00	06 22	01 00
	Get		BE EF 03 06 00	85 73	02 00	06 22	00 00
Progressive	Set	off	BE EF 03 06 00	4A 72	01 00	07 22	00 00
		TV	BE EF 03 06 00	DA 73	01 00	07 22	01 00
		FILM	BE EF 03 06 00	2A 73	01 00	07 22	02 00
	Get		BE EF 03 06 00	79 72	02 00	07 22	00 00
Black	Set	off	BE EF 03 06 00	5E 71	01 00	08 22	00 00
		on	BE EF 03 06 00	CE 70	01 00	08 22	01 00
	Get		BE EF 03 06 00	6D 71	02 00	08 22	00 00
HDTV	Set	1080i	BE EF 03 06 00	F2 73	01 00	05 22	00 00
		1035i	BE EF 03 06 00	62 72	01 00	05 22	01 00
	Get		BE EF 03 06 00	C1 73	02 00	05 22	00 00
PinP Size	Set	off	BE EF 03 06 00	FE 22	01 00	00 23	00 00
		Large	BE EF 03 06 00	6E 23	01 00	00 23	01 00
		Small	BE EF 03 06 00	9E 23	01 00	00 23	02 00
	Get		BE EF 03 06 00	Cd 22	02 00	00 23	00 00

Command data chart

Names	Operation type		Header			CRC	Action	Type	Setting code
PinP Position	Set	Upper left	BE EF	03	06 00	02 23	01 00	01 23	00 00
		Upper right	BE EF	03	06 00	92 22	01 00	01 23	01 00
		bottom left	BE EF	03	06 00	62 22	01 00	01 23	03 00
		bottom right	BE EF	03	06 00	F2 23	01 00	01 23	02 00
	Get		BE EF	03	06 00	31 23	02 00	01 23	00 00
PinP Audio ch	Set	RGB	BE EF	03	06 00	BA 22	01 00	03 23	00 00
		Video	BE EF	03	06 00	2A 23	01 00	03 23	01 00
	Get		BE EF	03	06 00	89 22	02 00	03 23	00 00
PinP Input	Set	Video	BE EF	03	06 00	D6 22	01 00	02 23	01 00
		S-Video	BE EF	03	06 00	26 22	01 00	02 23	02 00
		Component	BE EF	03	06 00	16 20	01 00	02 23	05 00
	Get		BE EF	03	06 00	75 23	02 00	02 23	00 00
FOCUS	Increment		BE EF	03	06 00	6A 93	04 00	00 24	00 00
	Decrement		BE EF	03	06 00	BB 92	05 00	00 24	00 00
Zoom	Increment		BE EF	03	06 00	96 92	04 00	01 24	00 00
	Decrement		BE EF	03	06 00	47 93	05 00	01 24	00 00
Sync on G	Set	off	BE EF	03	06 00	CB D0	01 00	08 30	01 00
		on	BE EF	03	06 00	5B D1	01 00	08 30	00 00
	Get		BE EF	03	06 00	68 D1	02 00	08 30	00 00
WHISPER	Set	NORMAL	BE EF	03	06 00	3B 23	01 00	00 33	00 00
		WHISPER	BE EF	03	06 00	AB 22	01 00	00 33	01 00
	Get		BE EF	03	06 00	08 23	02 00	00 33	00 00
GAMMA	Set	NORMAL	BE EF	03	06 00	C7 F0	01 00	A1 30	00 00
		CINEMA	BE EF	03	06 00	57 F1	01 00	A1 30	01 00
		DYNAMIC	BE EF	03	06 00	A7 F1	01 00	A1 30	02 00
		6500K	BE EF	03	06 00	37 F0	01 00	A1 30	03 00
	Get		BE EF	03	06 00	F4 F0	02 00	A1 30	00 00

Note: "Command data" spans the CRC, Action, Type and Setting code columns.

MEMO



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